AMSAA

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(ADDENDUM TO AMSAA TECHNICAL REPORT NO. 311)

A METHODOLOGY FOR SIMULATING MISSION DEFERMENT IN THE TACTICAL VEHICLE EVALUATION MODEL (TVEM)

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NOVEMBER 1980

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

A methodology to permit the deferral of missions in anticipation of slack periods in the mission schedule has been developed and incorporated in the Tactical Vehicle Evaluation Model (TVEM). This report, an addendum to AMSAA Technical Report No. 311, dated October 1980, documents this methodology improvement. Included are the program listing, deferment program narrative, test case input and output, and other detailed documentation.

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A METHODOLOGY FOR SIMULATING MISSION DEFERMENT IN THE TACTICAL VEHICLE EVALUATION MODEL (TVEM)
(Addendum to AMSAA Technical Report No. 311)

1. INTRODUCTION

The Tactical Vehicle Evaluation Model (TVEM) is a computer simulation designed to compare various tactical vehicle fleet mixes in an operational context by combining vehicle performance factors with scenario-related requirements information. The vehicle fleet is organized into pools; each pool consists of a specified number of vehicles, with similar weight and cubic capacities, operating from a given location. To each pool is assigned a schedule of supply missions to be performed. For each mission, the schedule specifies the amount of cargo to be hauled, the day and time that the mission is to occur, and the route on which the vehicles must travel. Given the amount of mission cargo, the vehicle hauling capacity, and the travel and cargo handling times for the route, the TVEM determines the number of vehicles required for the mission as well as its duration. The results of the simulation for each pool consist of the number of missions completed, the number of assigned vehicles used, the percentage of unused vehicle capacity, and other measures of efficiency.

AMSAA Technical Report No. 311[1] documents the TVEM and the reader is referred to that report for a thorough discussion of the model logic and input development as well as instructions for setting up the input data for the TVEM computer program. In the discussion of the model logic, TR-311 points out that the model has several limitations. One limitation is that missions assigned to a pool cannot be deferred or postponed in anticipation of slack time. That is, if an insufficient number of vehicles is available to undertake a mission at its scheduled time, it will either be transferred to a support pool or skipped, i.e. unfulfilled, even though enough vehicles might be available perhaps a short time later.

The methodology to permit, whenever desirable, the deferral of missions has been incorporated in the TVEM and it is the purpose of this report to document the model improvement.

2. DISCUSSION

The deferral methodology is designed to give the TVEM user a wide variety of options in the exercising of this form of mission disposition. In TR-311 it is pointed out that one of the necessary input items for each mission is a value that denotes whether the mission may be transferred to a support pool or if it must be skipped in the event that it cannot be undertaken at the scheduled time. Another input item that must now be provided

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[1] Butler, S. and Ferguson, W., Tactical Vehicle Evaluation Model (TVEM), AMSAA TR-311, October 1980. UNCLASSIFIED REPORT.

for each mission denotes whether it is permissible to defer the mission for a time if it cannot be fulfilled or if, instead, it must be transferred immediately or skipped. In the TVEM main program are two delay times, "TRTM" and "DFTM," whose values are given in a FORTRAN DATA Statement. The delay times are in minutes and must satisfy the relationship that the value assigned to "TRTM" cannot be greater than that assigned to "DFTM." The two delay times govern the deferral of missions, for which deferral is permissible, as follows. A mission which may not be transferred to a support pool will be held for as long as "DFTM" minutes. If vehicles cannot start the mission before "DFTM" minutes elapse, the mission will be skipped and, hence, unfulfilled. Transferable missions, on the other hand, are modeled in a more complicated manner. A TVEM control parameter, called "ITRNS," interacts with "TRTM" and "DFTM" to control the handling of each mission in this category. Depending upon the user assigned value of "ITRNS," all such missions will be treated in one of three ways:

(a) the missions will be transferred without delay,

(b) the missions will be deferred for at most "TRTM" minutes, or

(c) the missions will be deferred for at most "DFTM" minutes.

In the latter two cases any mission that cannot be undertaken within the applicable delay time will be transferred at the end of that delay time.

One exception to the execution of mission deferrals occurs when the tonnage or cube specified in the mission input information is such that more vehicles are required than are assigned to the pool and the mission cannot be split. In this case the TVEM makes no attempt to defer the mission even though it may have been denoted by the user to be permissible to do so in the mission input information. The user need not check the mission input information for the potential occurrence of these illogical deferral attempts because a check built into the coding of the deferral routines automatically aborts such attempts and ensures that the disposition of the missions is properly controlled.

The values assigned to the delay times and to the control parameter are easily changed. For a consolidated list of all TVEM control parameters and option variables, see Appendix B.

Figure 1 is a flowchart of the main simulation portion of the improved version of the TVEM. It gives an overview of the methodology for deferring missions and shows how it fits into the overall model logic.

If the TVEM determines that a mission cannot be undertaken at the scheduled time, the routines associated with deferring a mission first determine whether it is permissible to defer the mission and whether there are enough vehicles assigned to the pool to undertake the mission. When a pool does not have enough vehicles assigned to undertake a mission, the mission is either transferred to another pool or skipped. If it is permissible to defer the mission and enough vehicles are assigned to the pool, the model searches the schedule of remaining missions for a period of

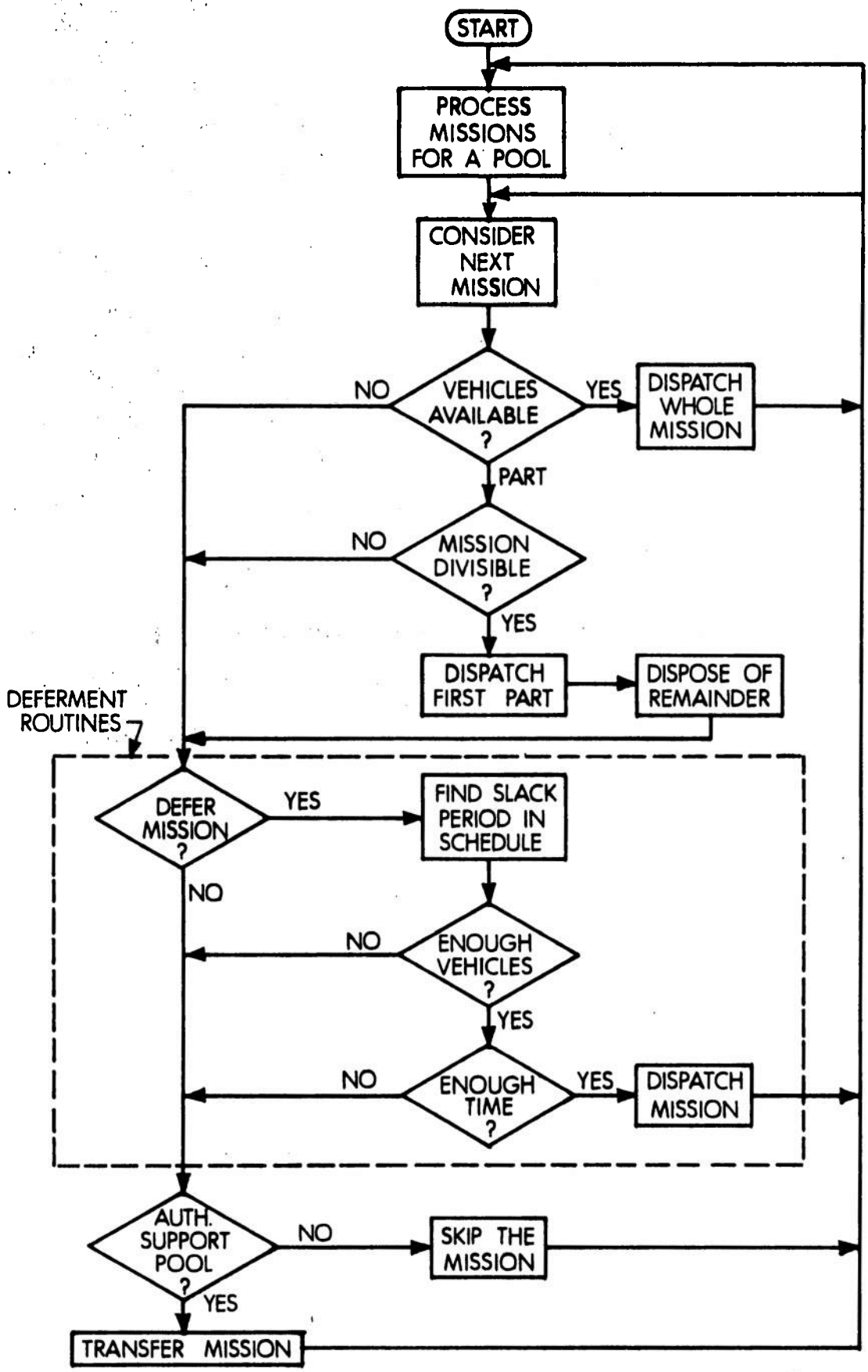

Figure 1. Flowchart of Improved TVEM.

slack time during which the mission can be completed. If the model determines that a suitable slack period in the schedule does not exist either because a sufficient number of vehicles will not be available or because the slack period begins after the permissible delay time, the attempt to defer the mission is abandoned and the mission is transferred or skipped. However, if the model determines that a suitable slack period does exist, the mission is considered completed. In any event, after the proper disposition of the mission has been determined, the TVEM considers the next scheduled event for the pool.

Any mission that cannot be deferred when necessary or one that has been deferred unsuccessfully will appear among those missions in the Mission Status Report that were transferred or skipped. Information on missions that have been successfully deferred is given under a separate disposition category in the Mission Status Report. In addition, a separate report dedicated exclusively to deferred missions is printed with the simulation results for each pool. Called the Deferred Missions Report, it gives the number of such missions completed, the per-mission average number of hours delay, the per-mission average number of trucks required, etc.

Refer to Appendix C for a more detailed discussion of the mission deferment methodology.

3. SUMMARY

The documentation contained in this report enables the TVEM user to use the mission deferment feature recently added to the model. It is believed that this methodology improvement incorporates sufficient flexibility to permit the user to conform to various doctrinal considerations in the deferment of missions. Detailed documentation of the basic TVEM is found in the referenced report.

APPENDIX A

PROGRAM LISTING

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```
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM    STANB     MMMMMMMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM    STANB     MMMMMMMMMMMMMMMMMM
MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM    STANB     MMMMMMMMMMMMMMMMMM
```

```
 SSSSSSSSS   TTTTTTTT      AAAA     NN      NN  BBBBBBBBB     999999    VV      VV
 SSSSSSSSS   TTTTTTTT      AAAA     NN      NN  BBBBBBBBB     999999    VV      VV
SS              TT        AA  AA    NNNN    NN  BB      BB   99    99   VV      VV
SS              TT        AA  AA    NNNN    NN  BB      BB   99    99   VV      VV
 SSSSSSSS       TT       AA    AA   NN  NN  NN  BBBBBBBBB     9999999    VV    VV
 SSSSSSSS       TT       AA    AA   NN  NN  NN  BBBBBBBBB     9999999    VV    VV
        SS      TT      AAAAAAAAAA  NN    NNNN  BB      BB         99     VV  VV
        SS      TT      AAAAAAAAAA  NN    NNNN  BB      BB         99     VV  VV
        SS      TT      AA      AA  NN     NNN  BB      BB         99      VVVV
        SS      TT      AA      AA  NN     NNN  BB      BB         99      VVVV
SSSSSSSSS       TT      AA      AA  NN      NN  BBBBBBBBB        999        VV
SSSSSSSSS       TT      AA      AA  NN      NN  BBBBBBBBB        999        VV
```

```
1.5  B R L  VER 010  ***   09/18/80      80262

LS=377K FLL=1750K MXS=300K MXL=1305K MXB=1305B

GIN
 AD     BRL NOS/BE 1.3 L499 VER 006    08/18/80
     -STANB,STMFZ,T10.     IMPROVED TACTICAL VEHICLE EVALUATION MODEL          AUG.80
     -ACCOUNT,SA***.       STAN BUTLER          367/2173
     -DISPOSE(OUTPUT,ST=MFA,*PR)
     -COMMENT.  SET LCM TO 262,144 WORDS.
     -RFL(L=1000)
     -BEGIN,ATTACH,PLOTLIB.
        PF646 - PFMACRO - ATTACH  - PLOTLIB - PLOTLIB
        PF254 - CYCLE     4 ATTACHED FROM SN=SYSTEM
     -ATTACH,PLOTBINARY,ID=SPBPLTLIB,MR=1.
        PF053 - LFN  IS   PLOTBIN
        PF254 - CYCLE     4 ATTACHED FROM SN=SYSTEM
     -LIBRARY,*,PLOTBIN.
     -REVERT.
     -REQUEST(TAPE13,*PF)
     -ATTACH(OLDPL,TVEM,CY=1,ID=SBUTLER)
        PF254 - CYCLE     1 ATTACHED FROM SN=SYSTEM
     -UPDATE(F)
      READING INPUT
      UPDATE COMPLETED
     -FTN(I,SL,R=0,LCM=I)
           2.986 CP SECONDS COMPILATION TIME
     -MAP(OFF)
     -LGO.
        LD610 - FLS REQUIRED TO LOAD - 0016431 OU.COG
        LD603 - EXECUTION INITIATED OS.EXP
       FORTRAN LIBRARY 508          05/27/80
          STOP
          054000   FINAL EXECUTION FL.
            .092 CP SECONDS EXECUTION TIME.
     -BEGIN,PLOT,CALCOMP,TAPE13.
        PF646 - PFMACRO - ATTACH  - CALCOMP - CALCOMP
        PF254 - CYCLE     6 ATTACHED FROM SN=SYSTEM
     -IFE,FILE(TAPE13,AS.AND.RD),GOODFILE.
     -ATTACH,ZZPLTZQ,ID=SPBPLTQUE,PW=******.
        PF053 - LFN  IS   ZZPLTZQ
        PF254 - CYCLE     1 ATTACHED FROM SN=SYSTEM
     -EXIT,U.
     -IFE,FILE(ZZPLTZQ,PF.AND.WR),PLOTFILE.
     -REWIND,ZZPLTZQ,TAPE13.
     -SKIPF,ZZPLTZQ,131071,17.
        UT031 - EOI ENCOUNTERED
     -IFE,NUM(0).EQ.FALSE,INMODE.
      ENDIF,INMODE.
     -COPYR,TAPE13,ZZPLTZQ,100000.
        UT031 - EOI ENCOUNTERED
        UT035 -     EOR -          0
     -EXTEND,ZZPLTZQ.
        PF257 - FILE EXTENDED
     -RETURN,ZZPLTZQ.
     -REVERT.
     -EXIT.
        JM166 - MAXIMUM USER SCM          54000B WORDS
        JM167 - MAXIMUM USER LCM        1000000B WORDS
        JM170 - MAXIMUM JS+IO LCM           135B BUFFERS
        RM770 - MAXIMUM ACTIVE FILES                   5
        RM771 - OPEN/CLOSE CALLS                      52
        RM772 - DATA TRANSFER CALLS                20,001
        RM773 - CONTROL/POSITIONING CALLS             164
        RM774 - BM DATA TRANSFER CALLS              2,865
        RM775 - BM CONTROL/POSITIONING CALLS          202
```

```
RM775 - BM CONTROL/POSITIONING CALLS                    342
RM776 - QUEUE MANAGER CALLS                             663
RM777 - RECALL CALLS                                    622
SCM                    73.742  KWS
LCM                1 207.621  KWS
I/O                    0.121  MW
RMS                    0.248  MWS
USER                   1.563  SEC
JOB                    4.612  SEC
DIO                1 447.496  KW
SS                     7.668  SEC
COST ESTIMATE         $1.49
SC050 - 000002 SC/LC SWAPS
```

```
% TVEM       76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

      PROGRAM TVEM(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,TAPE13)          MAIN        2
      DIMENSION  T(100,9,25), A(500,9,25), E(1000,2,25), P(15,25)         DEFER4      1
      DIMENSION  D(500,9), F(500,2,25), O(6,5,25), Q(12,25), G(25,5)      DEFER4      2
      DIMENSION  C(500,25), DT(6,25)                                      DEFER5      1
      INTEGER P                                                           MAIN        5
C-----------------------------------------------------------------------  DEFER4      4
C         LCM REQUIREMENT -- 252,000 OR 754,140B WORDS.                   DEFER4      5
C-----------------------------------------------------------------------  DEFER4      6
      LEVEL 2, T,A,F,E,D,C                                                DEFER4      7
      COMMON /     / NPOOLS,NY,B5,B6,NTRCK                                DEFER4      8
      COMMON / AAA / A                                                    DEFER4      9
      COMMON / BBB / D,E,F,T                                              DEFER4     10
      COMMON / CCC / C                                                    DEFER4     11
      COMMON / DDD / ITRNS,TRTM,DFTM,NCE,IB,NZE,DT                        DEFER5      2
      COMMON / GGG / G                                                    MAIN        8
      COMMON / OOO / O                                                    DEFER3      2
      COMMON / PPP / P                                                    MAIN        9
      COMMON / QQQ / Q                                                    MAIN       10
      COMMON / MCOL/ MCT,MCA,MCG                                          MAIN       11
      COMMON / MAX / MMISS,MLINK                                          MAIN       12
      DATA MAXP/ 25 /                                                     DEFER       5
      DATA MLINK,MCT/ 100, 9 /                                            MAIN       14
      DATA MMISS,MCA / 500, 9 /                                           DEFER4     13
      DATA MRG,MCG/ 25, 5 /                                               DEFER       6
      DATA LIST/ 1 /                                                      MAIN       17
      DATA IPLOT/ 0 /                                                     MAIN       18
      DATA ISP/ 0 /                                                       MAIN       19
      DATA IDF / 0 /                                                      DEFER4     14
      DATA ITRNS / 0 /                                                    DEFER4     15
      DATA TRTM,DFTM /  90. , 120. /                                      DEFER4     16
   10 FORMAT(16I5)                                                        MAIN       20
   20 FORMAT(10F8.0)                                                      MAIN       21
  100 FORMAT(1H1)                                                         MAIN       22
  110 FORMAT(1H ,125(1HX))                                                MAIN       23
C                                                                         MAIN       24
C                                                                         MAIN       25
C                                                                         MAIN       26
C                                                                         MAIN       27
      IF(TRTM.LE.DFTM) GO TO 1000                                         DEFER5      3
      TEMP=TRTM                                                           DEFER5      4
      TRTM=DFTM                                                           DEFER5      5
      DFTM=TEMP                                                           DEFER5      6
C-----------------------------------------------------------------------  MAIN       28
C              READ IN THE NUMBER OF POOLS TO BE SIMULATED.               MAIN       29
C-----------------------------------------------------------------------  MAIN       30
 1000 READ(5,10) NPOOLS                                                   MAIN       31
      IF(NPOOLS.LT.0) STOP                                                MAIN       32
      IF(NPOOLS.GT.0 .OR. NPOOLS.LE. MAXP) GO TO 1005                     MAIN       33
      WRITE(6,160) NPOOLS                                                 MAIN       34
  160 FORMAT(1H ,'WARNING--  NUMBER OF POOLS IS',I5)                      MAIN       35
      STOP                                                                MAIN       36
C-----------------------------------------------------------------------  MAIN       37
C              READ THE DATA FOR THE POOLS.                               MAIN       38
C-----------------------------------------------------------------------  MAIN       39
 1005 DO 1040 K=1,NPOOLS                                                  MAIN       40
C-----------------------------------------------------------------------  MAIN       41
C              READ IN --                                                 MAIN       42
```

```
C               POOL NUMBER, VEHICLE TYPE NUMBER, PAYLOAD (STX10),          MAIN        43
C               CAPACITY (CUBE), NUMBER OF TRUCKS IN POOL.                  MAIN        44
C-------------------------------------------------------------------------- MAIN        45
      READ(5,10) (P(J,K),J=1,5)                                             MAIN        46
C-------------------------------------------------------------------------- MAIN        47
C               READ IN INFORMATION ON THE LINKS.                           MAIN        48
C-------------------------------------------------------------------------- MAIN        49
      K1=0                                                                  MAIN        50
      DO 1010 I=1,MLINK                                                     MAIN        51
      READ(5,20) (T(I,J,K),J=1,MCT)                                         MAIN        52
      IF(T(I,1,K).LT.0.) GO TO 1020                                         MAIN        53
      K1=I                                                                  MAIN        54
 1010 CONTINUE                                                              MAIN        55
 1020 P(6,K)=K1                                                             MAIN        56
C-------------------------------------------------------------------------- MAIN        57
C               READ IN INFORMATION ON THE MISSIONS.                        MAIN        58
C-------------------------------------------------------------------------- MAIN        59
      K1=0                                                                  MAIN        60
      DO 1030 I=1,MMISS                                                     MAIN        61
      READ(5,20) (A(I,J,K),J=1,MCA)                                         MAIN        62
      IF(A(I,1,K).LT.0.) GO TO 1035                                         MAIN        63
      K1=I                                                                  MAIN        64
 1030 CONTINUE                                                              MAIN        65
 1035 P(7,K)=K1                                                             MAIN        66
      IF(LIST.GT.0) CALL OUT1(K)                                            MAIN        68
 1040 CONTINUE                                                              MAIN        70
C                                                                           MAIN        71
C                                                                           MAIN        72
C                                                                           MAIN        73
C-------------------------------------------------------------------------- MAIN        74
C               BEGIN SIMULATING THE MISSIONS, PROCESSING ONE POOL AT A     MAIN        75
C                    TIME.                                                  MAIN        76
C-------------------------------------------------------------------------- MAIN        77
      DO 7000 K=1,NPOOLS                                                    MAIN        78
      WRITE(6,120) P(1,K)                                                   MAIN        79
  120 FORMAT(1H0,10X,'SIMULATING POOL NO.',I5)                              MAIN        80
      NM=P(7,K)                                                             MAIN        81
      IF(NM.LE.0) GO TO 7000                                                MAIN        82
      DO 1060 I=1,6                                                         DEFER4      17
      DT(I,K)=0.                                                            DEFER5       7
      DO 1050 J=1,5                                                         DEFER4      18
      O(I,J,K)=0.                                                           MAIN        85
 1050 CONTINUE                                                              MAIN        86
 1060 CONTINUE                                                              MAIN        87
      NL=P(6,K)                                                             MAIN        88
C-------------------------------------------------------------------------- MAIN        89
C               PROCESS THE MISSIONS FOR THIS POOL.                         MAIN        90
C-------------------------------------------------------------------------- MAIN        91
      DO 2010 I=1,NM                                                        MAIN        92
      DO 1065 L=1,NL                                                        MAIN        93
      I3=L                                                                  MAIN        94
      IF(T(L,1,K).EQ.A(I,1,K)) GO TO 1070                                   MAIN        95
 1065 CONTINUE                                                              MAIN        96
      WRITE(6,130) P(1,K),A(I,1,K)                                          MAIN        97
  130 FORMAT(1H0,'WARNING--- FILE',I3,' DOES NOT CONTAIN LINK',F7.0,10X,     MAIN        98
     . *'SKIPPING TO NEXT POOL')                                            MAIN        99
      GO TO 7000                                                            MAIN       100
```

```
 1070 CONTINUE                                                          MAIN      101
C-------------------------------------------------------------------- MAIN      102
C               CALCULATE THE TIME REQUIRED TO ACCOMPLISH THE MISSION, MAIN      103
C                    (IF UNDERTAKEN).                                  MAIN      104
C-------------------------------------------------------------------- MAIN      105
      F(I,1,K)=0.                                                       MAIN      106
      DO 1080 J=2,MCT                                                   MAIN      107
      F(I,1,K)=F(I,1,K)+T(I3,J,K)                                       MAIN      108
 1080 CONTINUE                                                          MAIN      109
      IF(A(I,3,K).EQ.0.) GO TO 1090                                     MAIN      110
C-------------------------------------------------------------------- MAIN      111
C               CALCULATE DEPARTURE TIME (IN TOTAL MINUTES).            MAIN      112
C-------------------------------------------------------------------- MAIN      113
      E(I,1,K)=1440.*A(I,2,K)+A(I,3,K)-40.*AINT(A(I,3,K)/100.)          MAIN      114
      GO TO 2000                                                        MAIN      115
C-------------------------------------------------------------------- MAIN      116
C               CALCULATE THE DEPARTURE TIME (IN TOTAL MINUTES) REQUIRED MAIN      117
C                    TO MEET THE SCHEDULED DELIVERY TIME.               MAIN      118
C-------------------------------------------------------------------- MAIN      119
 1090 F(I,1,K)=1440.*A(I,2,K)+A(I,4,K)-40.*AINT(A(I,4,K)/100.)-F(I,1,K) MAIN      120
C-------------------------------------------------------------------- MAIN      121
C               IF IT IS A SUPPLY MISSION, DROP THE TIME REQUIRED TO    MAIN      122
C                    RETURN TO THE SUPPORT POOL.                        MAIN      123
C-------------------------------------------------------------------- MAIN      124
      IF(T(I3,9,K).EQ.0. .OR. A(I,8,K).GT.2.)                           MAIN      125
     *                          E(I,1,K)=E(I,1,K)+T(I3,7,K)+T(I3,8,K)   MAIN      126
 2000 CONTINUE                                                          MAIN      127
C-------------------------------------------------------------------- MAIN      128
C               CALCULATE THE TIME THE VEHICLES WILL BE AVAILABLE TO    MAIN      129
C                    UNDERTAKE THE NEXT MISSION.                        MAIN      130
C-------------------------------------------------------------------- MAIN      131
      I7=I+P(7,K)                                                       MAIN      132
      E(I7,1,K)=E(I,1,K)+F(I,1,K)                                       MAIN      133
      E(I,2,K)=FLOAT(I)                                                 MAIN      134
      E(I7,2,K)=-E(I,2,K)                                               MAIN      135
C-------------------------------------------------------------------- MAIN      136
C               FIND THE PERCENT WT. CAPACITY OF A VEHICLE REQUIRED FOR MAIN      137
C                    THE MISSION.                                       MAIN      138
C-------------------------------------------------------------------- MAIN      139
      B5=100.*A(I,5,K)/FLOAT(P(3,K))                                    MAIN      140
C-------------------------------------------------------------------- MAIN      141
C               FIND THE PERCENT CUBE CAPACITY OF A VEHICLE REQUIRED.   MAIN      142
C-------------------------------------------------------------------- MAIN      143
      B6=100.*A(I,6,K)/FLOAT(P(4,K))                                    MAIN      144
C-------------------------------------------------------------------- MAIN      145
C               STORE THE MORE STRINGENT REQUIREMENT.  (THIS IS REALLY  MAIN      146
C                    THE NUMBER OF VEHICLES REQUIRED, MULTIPLIED BY 100). MAIN      147
C-------------------------------------------------------------------- MAIN      148
      F(I,2,K)=AMAX1(B5,B6)                                             MAIN      149
      C(I,K)=F(I,2,K)                                                   DEFER4     19
 2010 CONTINUE                                                          MAIN      150
      F(MMISS,1,K)=1.                                                   MAIN      151
C-------------------------------------------------------------------- MAIN      152
C               SORT THE MISSION TIMES (INCLUDING AVAILABILITY TIMES)   MAIN      153
C                    FROM EARLIEST TO LATEST, GIVING A CHRONOLOGICAL    MAIN      154
C                    SEQUENCE OF MISSION EVENTS.                        MAIN      155
C-------------------------------------------------------------------- MAIN      156
```

```
      CALL SORT(K)                                                      MAIN      158
C-----------------------------------------------------------------------MAIN      160
C               STORE THE EARLIEST DISPATCH OR DEPARTURE TIME.          MAIN      161
C-----------------------------------------------------------------------MAIN      162
      P(9,K)=E(1,1,K)                                                   MAIN      163
C-----------------------------------------------------------------------MAIN      164
C               STORE LATEST VEHICLE AVAILABILITY TIME.                 MAIN      165
C-----------------------------------------------------------------------MAIN      166
      I7=2*P(7,K)                                                       MAIN      167
      P(10,K)=E(I7,1,K)                                                 MAIN      168
      P(8,K)=0                                                          MAIN      169
      P(11,K)=0                                                         MAIN      170
      NZ3=0                                                             MAIN      171
      NZ7=0                                                             MAIN      172
      DO 2040 I=1,NM                                                    MAIN      173
      IF(A(I,8,K).GT.2.) GO TO 2030                                     DEFER4     20
      IF(ISP) 2020,2030,2025                                            DEFER4     21
 2020 A(I,8,K)=1.                                                       DEFER4     22
      GO TO 2030                                                        DEFER4     23
 2025 A(I,8,K)=2.                                                       DEFER4     24
 2030 CONTINUE                                                          DEFER4     25
      IF(IDF) 2033,2040,2037                                            DEFER4     26
 2033 A(I,9,K)=0.                                                       DEFER4     27
      GO TO 2040                                                        DEFER4     28
 2037 A(I,9,K)=1.                                                       DEFER4     29
 2040 CONTINUE                                                          MAIN      179
C                                                                       MAIN      180
C                                                                       MAIN      181
C                                                                       MAIN      182
C***********************************************************************MAIN      183
C                                                                       MAIN      184
C               PROCESS EACH EVENT.                                     MAIN      185
C                                                                       MAIN      186
C***********************************************************************MAIN      187
      NZ=NM                                                             MAIN      188
      IB=0                                                              DEFER4     30
      DO 5000 I=1,I7                                                    MAIN      189
      NCE=I                                                             DEFER4     31
      NY=INT(ABS(E(I,2,K)))                                             MAIN      190
C-----------------------------------------------------------------------DEFER4     32
C               FIND THE NUMBER OF VEHICLES REQUIRED FOR THIS MISSION.  DEFER4     33
C-----------------------------------------------------------------------DEFER4     34
      NTRCK=INT(F(NY,2,K)/100.)                                         DEFER4     35
      IF(AMOD(F(NY,2,K),100.).NE.0.) NTRCK=NTRCK+1                      DEFER4     36
C-----------------------------------------------------------------------MAIN      191
C               IS IT A MISSION OR A RETURN FROM A MISSION.             MAIN      192
C-----------------------------------------------------------------------MAIN      193
      IF(E(I,2,K).LT.0.) GO TO 2050                                     MAIN      194
C-----------------------------------------------------------------------MAIN      195
C               DETERMINE HOW MANY VEHICLES WILL BE OCCUPIED IF THIS    DEFER4     37
C                    MISSION IS UNDERTAKEN.                             DEFER4     38
C-----------------------------------------------------------------------MAIN      197
      P(8,K)=P(8,K)+NTRCK                                               DEFER4     39
C-----------------------------------------------------------------------MAIN      200
C               ARE THERE ENOUGH VEHICLES IN THE POOL.                  MAIN      201
C-----------------------------------------------------------------------MAIN      202
      IF(P(8,K).LE.P(5,K)) GO TO 4050                                   MAIN      203
```

```
      NZ7=1                                                                 MAIN      204
C-----------------------------------------------------------------------    MAIN      205
C               DETERMINE THE NUMBER OF VEHICLES RETURNING FROM A MISSION   MAIN      206
C                    OR IF THERE ARE NOT ENOUGH VEHICLES IN THE POOL TO     MAIN      207
C                    TAKE THE WHOLE MISSION, RESET THE INDICATOR.           MAIN      208
C-----------------------------------------------------------------------    MAIN      209
 2050 P(8,K)=P(8,K)-NTRCK                                                   DEFER4     40
      IF(NZ7.EQ.0) GO TO 5000                                               MAIN      212
      NZ7=0                                                                 MAIN      213
      I8=INT(A(NY,8,K))                                                     MAIN      214
      IF(I8.GT.15) I8=I8-15                                                 DEFER       7
      GO TO (2060,3020,5000,3040,5000,3050,5000,4020), I8                   MAIN      216
C                                                                           MAIN      217
C                                                                           DEFER4     41
C****************************  ORIGINAL MISSIONS  ***********************   DEFER4     42
C                                                                           MAIN      218
 2060 IF(P(8,K).EQ.P(5,K)) GO TO 3000                                       MAIN      219
      A(NY,8,K)=27.                                                         DEFER       8
      NZ=NZ+1                                                               MAIN      221
      BT=AMAX1(A(NY,5,K)/FLOAT(P(3,K)),A(NY,6,K)/FLOAT(P(4,K)))             MAIN      222
      ZT=FLOAT(P(5,K)-P(8,K))                                               MAIN      223
      Z5=100.*ZT                                                            MAIN      224
      TEMP=ZT/BT                                                            MAIN      225
C-----------------------------------------------------------------------    MAIN      226
C               HOW MUCH OF THIS CARGO CAN THE POOL HAUL (IN TONS AND       MAIN      227
C                    CUBE) WITH THE VEHICLES AVAILABLE.                     MAIN      228
C-----------------------------------------------------------------------    MAIN      229
      B5=A(NY,5,K)*TEMP                                                     MAIN      230
      B6=A(NY,6,K)*TEMP                                                     MAIN      231
      F(NY,2,K)=Z5                                                          MAIN      232
C-----------------------------------------------------------------------    MAIN      233
C               INCREASE THE INDICATOR TO ACCOUNT FOR THE PARTIAL MISSION   MAIN      234
C-----------------------------------------------------------------------    MAIN      235
      P(8,K)=P(5,K)                                                         MAIN      236
C-----------------------------------------------------------------------    MAIN      237
C               STORE THE INFO ON THE MISSION COMPLETED IN PART.  THE       MAIN      238
C                    REMAINDER OF THE MISSION WILL BE DEFERRED (COMPLETED   DEFER4     43
C                    LATER), TRANSFERRED, OR SKIPPED.                       DEFER4     44
C-----------------------------------------------------------------------    MAIN      241
      DO 2070 J=1,MCA                                                       MAIN      242
      A(NZ,J,K)=A(NY,J,K)                                                   MAIN      243
 2070 CONTINUE                                                              MAIN      244
      A(NZ,5,K)=B5                                                          MAIN      245
      A(NZ,6,K)=B6                                                          MAIN      246
      A(NZ,8,K)=3.                                                          MAIN      247
      F(NZ,1,K)=F(NY,1,K)                                                   MAIN      248
      F(NZ,2,K)=Z5                                                          MAIN      249
      NA=2*NZ                                                               MAIN      250
      E(NA,1,K)=E(I,1,K)+F(NY,1,K)                                          MAIN      251
      E(NA,2,K)=-FLOAT(NZ)                                                  MAIN      252
      NB=NA-1                                                               MAIN      253
      E(NB,1,K)=E(I,1,K)                                                    MAIN      254
      E(NB,2,K)= FLOAT(NZ)                                                  MAIN      255
      F(MMISS,1,K)=3.                                                       MAIN      256
      GO TO 4030                                                            DEFER3      3
C                                                                           MAIN      292
C                                                                           MAIN      293
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C-------------------------------------------------------------------- MAIN      294
C               NO VEHICLES AVAILABLE TO HAUL EVEN PART OF THE CARGO.  IF MAIN      295
C                    THE MISSION CAN'T BE DEFERRED OR TRANSFERRED, IT    DEFER4    45
C                    WILL BE SKIPPED.                                    DEFER4    46
C-------------------------------------------------------------------- MAIN      297
 3000 A(NY,8,K)=7.                                                       DEFER4    47
      GO TO 4040                                                         DEFER3     4
C                                                                        MAIN      314
C                                                                        MAIN      315
C-------------------------------------------------------------------- MAIN      316
C               THE MISSION CAN'T BE SPLIT.  IF IT CAN'T BE DEFERRED OR  DEFER4    48
C                    TRANSFERRED, IT WILL BE SKIPPED.                    DEFER4    49
C-------------------------------------------------------------------- MAIN      319
 3020 A(NY,8,K)=9.                                                       DEFER4    50
      GO TO 4040                                                         DEFER3     5
C                                                                        MAIN      336
C                                                                        DEFER4    51
C***************************  ADDITIONAL MISSIONS  ********************** DEFER4    52
C                                                                        MAIN      337
C-------------------------------------------------------------------- MAIN      338
C               ADDITIONAL MISSION RESULTING FROM TRANSFERRAL OF THE     MAIN      339
C                    REMAINDER OF A SPLIT MISSION.  SINCE THERE ARE NOT  MAIN      340
C                    ENOUGH VEHICLES, THE MISSION WILL BE SKIPPED (WILL  MAIN      341
C                    NOT BE SPLIT FURTHER) IF IT CAN'T BE DEFERRED.      DEFER4    53
C-------------------------------------------------------------------- MAIN      343
 3040 A(NY,8,K)=13.                                                      DEFER4    54
      A(NY,7,K)=0.                                                       DEFER4    55
      GO TO 4040                                                         DEFER4    56
C                                                                        MAIN      347
C                                                                        MAIN      348
C-------------------------------------------------------------------- MAIN      349
C               ADDITIONAL MISSION RESULTING FROM TRANSFERRAL OF AN      MAIN      350
C                    ENTIRE MISSION.                                     MAIN      351
C-------------------------------------------------------------------- MAIN      352
 3050 IF(P(8,K).EQ.P(5,K)) GO TO 4000                                    MAIN      353
      A(NY,8,K)=26.                                                      DEFER      10
      NZ=NZ+1                                                            MAIN      355
      BT=AMAX1(A(NY,5,K)/FLOAT(P(3,K)),A(NY,6,K)/FLOAT(P(4,K)))          MAIN      356
      ZT=FLOAT(P(5,K)-P(8,K))                                            MAIN      357
      Z5=100.*ZT                                                         MAIN      358
      TEMP=ZT/BT                                                         MAIN      359
C-------------------------------------------------------------------- MAIN      360
C               HOW MUCH OF THIS CARGO CAN THE POOL HAUL (IN TONS AND    MAIN      361
C                    CUBE) WITH THE VEHICLES AVAILABLE.                  MAIN      362
C-------------------------------------------------------------------- MAIN      363
      B5=A(NY,5,K)*TEMP                                                  MAIN      364
      B6=A(NY,6,K)*TEMP                                                  MAIN      365
      F(NY,2,K)=Z5                                                       MAIN      366
C-------------------------------------------------------------------- MAIN      367
C               INCREASE THE INDICATOR TO ACCOUNT FOR THE PARTIAL MISSION MAIN      368
C-------------------------------------------------------------------- MAIN      369
      P(8,K)=P(5,K)                                                      MAIN      370
C-------------------------------------------------------------------- MAIN      371
C               STORE THE INFO ON THE MISSION COMPLETED IN PART.  THE    MAIN      372
C                    REMAINDER OF THE MISSION WILL BE DEFERRED,          DEFER4    57
C                    TRANSFERRED, OR SKIPPED.                            DEFER4    58
C-------------------------------------------------------------------- MAIN      376
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      DO 3060 J=1,MCA                                                    MAIN      377
      A(NZ,J,K)=A(NY,J,K)                                                MAIN      378
 3060 CONTINUE                                                           MAIN      379
      A(NZ,5,K)=B5                                                       MAIN      380
      A(NZ,6,K)=B6                                                       MAIN      381
      A(NZ,8,K)=18.                                                      DEFER      11
      F(NZ,1,K)=F(NY,1,K)                                                MAIN      383
      F(NZ,2,K)=Z5                                                       MAIN      384
      NA=2*NZ                                                            MAIN      385
      E(NA,1,K)=E(I,1,K)+F(NY,1,K)                                       MAIN      386
      E(NA,2,K)=-FLOAT(NZ)                                               MAIN      387
      NB=NA-1                                                            MAIN      388
      E(NB,1,K)=E(I,1,K)                                                 MAIN      389
      E(NB,2,K)= FLOAT(NZ)                                               MAIN      390
      F(MMISS,1,K)=3.                                                    MAIN      391
      GO TO 4030                                                         DEFER3      7
C                                                                        MAIN      424
C                                                                        MAIN      425
C-------------------------------------------------------------------     MAIN      426
C               NO VEHICLES AVAILABLE TO HAUL EVEN PART OF THE CARGO.  IF MAIN      427
C                    THE MISSION CAN'T BE DEFERRED OR TRANSFERRED, IT    DEFER4     59
C                    WILL BE SKIPPED.                                    DEFER4     60
C-------------------------------------------------------------------     MAIN      429
 4000 A(NY,8,K)=15.                                                      DEFER4     61
      GO TO 4040                                                         DEFER3      8
C                                                                        MAIN      446
C                                                                        MAIN      447
C-------------------------------------------------------------------     MAIN      448
C               THE MISSION CAN'T BE SPLIT.  IF IT CAN'T BE DEFERRED OR  DEFER4     62
C                    TRANSFERRED, IT WILL BE SKIPPED.                    DEFER4     63
C-------------------------------------------------------------------     MAIN      451
 4020 A(NY,8,K)=17.                                                      DEFER4     64
      GO TO 4D40                                                         DEFER3      9
C                                                                        DEFER3     10
C                                                                        DEFER3     11
C-------------------------------------------------------------------     DEFER4     65
C               FIND THE AMOUNT OF CARGO REMAINING FROM THE SPLIT MISSION DEFER4     66
C-------------------------------------------------------------------     DEFER4     67
 4030 CALL REMAIN(K)                                                     DEFER4     68
C-------------------------------------------------------------------     DEFER4     69
C               CAN THE MISSION BE COMPLETED LATER.                      DEFER4     70
C-------------------------------------------------------------------     DEFER4     71
 4040 CALL PSTPN(K,IRT)                                                  DEFER4     72
C-------------------------------------------------------------------     DEFER4     73
C               IF IT CAN BE COMPLETED LATER AND IT'S AN ENTIRE MISSION - DEFER4     74
C-------------------------------------------------------------------     DEFER4     75
      IF(IRT.EQ.1 .AND. A(NY,8,K).LT.26.) GO TO 4050                     DEFER4     76
C-------------------------------------------------------------------     DEFER6      1
C               BUT IF IT CAN'T BE COMPLETED LATER AND IT'S AN ENTIRE     DEFER6      2
C                    MISSION -                                           DEFER6      3
C-------------------------------------------------------------------     DEFER6      4
      IF(IRT.EQ.0 .AND. A(NY,8,K).LT.26.) F(NY,2,K)=0.                   DEFER5      8
C-------------------------------------------------------------------     DEFER4     77
C               IF IT'S THE REMAINDER OF A SPLIT MISSION, STORE THE INFO  DEFER4     78
C                    FOR REPORTING LATER AS A MISSION DEFERRED,          DEFER4     79
C                    TRANSFERRED, OR SKIPPED.                            DEFER4     80
C-------------------------------------------------------------------     DEFER4     81
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      IF(A(NY,8,K).GE.26.) CALL STRMSS(K)                                DEFER4     82
C-----------------------------------------------------------------------  DEFER3     19
C               IF IT CAN'T BE COMPLETED AT A LATER TIME ---             DEFER4     83
C               CAN THE ENTIRE MISSION OR THE REMAINDER OF THE SPLIT     DEFER3     20
C                    MISSION BE TRANSFERRED.  IF SO ---                  DEFER3     21
C               INCREASE THE COUNTER FOR MISSIONS TRANSFERRED AND STORE  DEFER3     22
C                    THE MISSION INFO FOR LATER EXECUTION OF TRANSFER.   DEFER3     23
C-----------------------------------------------------------------------  DEFER3     24
      IF(IRT.EQ.0 .AND. A(NY,7,K).GT.0.) CALL TRNSFR(K)                  DEFER5      9
      GO TO 4080                                                         DEFER4     85
C                                                                        MAIN      468
C                                                                        MAIN      469
C-----------------------------------------------------------------------  MAIN      470
C               SET THE MISSION DISPOSITION INDICATOR FOR MISSIONS THAT  MAIN      471
C                    WERE COMPLETED.                                     MAIN      472
C-----------------------------------------------------------------------  MAIN      473
 4050 I8=INT(A(NY,8,K))                                                  MAIN      474
      A(NY,8,K)=12.                                                      DEFER      17
      IF(I8.EQ.4 .OR. I8.EQ.19) GO TO 4080                               DEFER      18
      A(NY,8,K)=14.                                                      DEFER      19
      IF(I8.EQ.6 .OR. I8.EQ.21) GO TO 4080                               DEFER      20
      A(NY,8,K)=16.                                                      DEFER      21
      IF(I8.EQ.8 .OR. I8.EQ.23) GO TO 4080                               DEFER      22
      A(NY,8,K)=5.                                                       DEFER4     86
      IF(I8.EQ. 7.) GO TO 4080                                           DEFER4     87
      A(NY,8,K)=10.                                                      DEFER4     88
      IF(I8.EQ. 9.) GO TO 4080                                           DEFER4     89
      A(NY,8,K)=20.                                                      DEFER4     90
      IF(I8.EQ.13.) GO TO 4080                                           DEFER4     91
      A(NY,8,K)=22.                                                      DEFER4     92
      IF(I8.EQ.15.) GO TO 4080                                           DEFER4     93
      A(NY,8,K)=24.                                                      DEFER4     94
      IF(I8.EQ.17.) GO TO 4080                                           DEFER4     95
      A(NY,8,K)=FLOAT(I8)                                                MAIN      481
C-----------------------------------------------------------------------  MAIN      482
C               SET THE INDICATOR FOR MAXIMUM VEHICLE USEAGE IN THE POOL. MAIN     483
C-----------------------------------------------------------------------  MAIN      484
 4080 NZ3=MAXO(NZ3,P(8,K))                                               DEFER4     96
 5000 CONTINUE                                                           MAIN      487
C                                                                        MAIN      488
C                                                                        MAIN      489
C                                                                        MAIN      490
      P(7,K)=NZ                                                          MAIN      491
      P(8,K)=NZ3                                                         MAIN      492
      DO 5010 I=1,NZ                                                     MAIN      493
      IF(A(I,8,K).LT.26.) GO TO 5010                                     DEFER5     10
      F(I,2,K)=0.                                                        DEFER4    105
C-----------------------------------------------------------------------  DEFER4    106
C               RESET INDICATORS FOR REMAINDERS OF SPLIT MISSIONS THAT   DEFER4    107
C                    WERE COMPLETED LATER THAN THE SCHEDULED TIME.       DEFER4    108
C-----------------------------------------------------------------------  DEFER4    109
      IF(A(I,7,K).LT.0.) F(I,2,K)=C(I,K)                                 DEFER4    110
 5010 CONTINUE                                                           MAIN      496
      CALL SORT(K)                                                       MAIN      498
C-----------------------------------------------------------------------  MAIN      500
C               MOVE THE INFORMATION ON MISSIONS TO BE TRANSFERRED TO THE MAIN     501
C                    PROPER POOLS.                                       MAIN      502
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C------------------------------------------------------------------ MAIN      503
      CALL MVMSSN(K)                                               DEFER3     27
C                                                                  MAIN      534
C                                                                  MAIN      535
C------------------------------------------------------------------ MAIN      536
C               CALCULATE VEHICLE STATISTICS.                      MAIN      537
C------------------------------------------------------------------ MAIN      538
      F1=0.                                                        MAIN      539
      F2=0.                                                        MAIN      540
      F3=0.                                                        MAIN      541
      F4=0.                                                        MAIN      542
      DO 6005 I=1,12                                               MAIN      543
      Q(I,K)=0.                                                    MAIN      544
 6005 CONTINUE                                                     MAIN      545
      I7=P(7,K)                                                    MAIN      546
      DO 6040 I=1,I7                                               MAIN      547
      IF(F(I,2,K).EQ.0.) GO TO 6040                                MAIN      548
      DO 6010 L=1,NL                                               MAIN      549
      NY=L                                                         MAIN      550
      IF(T(L,1,K).EQ.A(I,1,K)) GO TO 6015                          MAIN      551
 6010 CONTINUE                                                     MAIN      552
 6015 CONTINUE                                                     MAIN      553
      F5=F(I,2,K)/100.                                             MAIN      554
      F1=F1+F5                                                     MAIN      555
      F2=F2+AINT(F5)                                               MAIN      556
      F3=F3+A(I,6,K)                                               MAIN      557
      F4=F4+A(I,5,K)                                               MAIN      558
      IF(AMOD(F(I,2,K),100.).EQ.0.) GO TO 6020                     MAIN      559
      F2=F2+1.                                                     MAIN      560
      F(I,2,K)=100.*AINT(F5)+100.                                  MAIN      561
      F5=F(I,2,K)/100.                                             MAIN      562
 6020 Q(1,K)=Q(1,K)+F5*(T(NY,4,K)+T(NY,7,K))                       MAIN      563
      Q(2,K)=Q(2,K)+F5*T(NY,2,K)                                   MAIN      564
      Q(3,K)=Q(3,K)+F5*T(NY,5,K)                                   MAIN      565
      Q(4,K)=Q(4,K)+F5*T(NY,8,K)                                   MAIN      566
      IF(T(NY,9,K).EQ.0.) GO TO 6030                               MAIN      567
C------------------------------------------------------------------ MAIN      568
C               FOR PICK-UP MISSIONS.                              MAIN      569
C------------------------------------------------------------------ MAIN      570
      Q(5,K)=Q(5,K)+F5*T(NY,6,K)                                   MAIN      571
      Q(6,K)=Q(6,K)+F5*T(NY,9,K)                                   MAIN      572
      GO TO 6040                                                   MAIN      573
C------------------------------------------------------------------ MAIN      574
C               FOR DELIVERY OR SUPPORT MISSIONS.                  MAIN      575
C------------------------------------------------------------------ MAIN      576
 6030 Q(5,K)=Q(5,K)+F5*T(NY,3,K)                                   MAIN      577
      Q(6,K)=Q(6,K)+F5*T(NY,6,K)                                   MAIN      578
 6040 CONTINUE                                                     MAIN      579
      IF(P(5,K).EQ.0) GO TO 6050                                   MAIN      580
C------------------------------------------------------------------ MAIN      581
C               UNUSED CAPACITY-                                   MAIN      582
C------------------------------------------------------------------ MAIN      583
      Q(7,K)=100.*(F2-F1)/F2                                       MAIN      584
C------------------------------------------------------------------ MAIN      585
C               CUBIC EFFICIENCY-                                  MAIN      586
C------------------------------------------------------------------ MAIN      587
      Q(8,K)=100.*F3/(F1*FLOAT(P(4,K)))                            MAIN      588
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C------------------------------------------------------------------------ MAIN      589
C               WEIGHT EFFICIENCY-                                        MAIN      590
C------------------------------------------------------------------------ MAIN      591
      Q(9,K)=100.*F4/(F1*FLOAT(P(3,K)))                                   MAIN      592
 6050 CONTINUE                                                            MAIN      593
 7000 CONTINUE                                                            MAIN      594
C                                                                         MAIN      595
C                                                                         MAIN      596
C                                                                         MAIN      597
C                                                                         MAIN      598
C************************************************************************ MAIN      599
C                                                                         MAIN      600
C          POST-PROCESSOR SECTION                                         MAIN      601
C                                                                         MAIN      602
C************************************************************************ MAIN      603
      DO 10000 K=1,NPOOLS                                                 MAIN      604
      WRITE(6,100)                                                        MAIN      605
      WRITE(6,110)                                                        MAIN      606
      CALL OUT2(K)                                                        MAIN      608
      DO 7060 I=1,MRG                                                     MAIN      610
      DO 7050 J=1,MCG                                                     MAIN      611
      G(I,J)=0.                                                           MAIN      612
 7050 CONTINUE                                                            MAIN      613
 7060 CONTINUE                                                            MAIN      614
      NM=P(7,K)                                                           MAIN      615
      IF(NM.LE.0) GO TO 9050                                              MAIN      616
      DO 9010 I=1,NM                                                      MAIN      617
      L=INT(A(I,8,K))                                                     MAIN      618
      IF(L.GE.1 .AND. L.LE.27) GO TO (7070,7070,8000,9010,7085,7080,7090 DEFER4    111
     A ,7080,7090,7085,9010,8010,8020,8030,8040,8030,8040,8060,9010,8015 DEFER4    112
     B ,8035,8038,8035,8038,9010,8050,8070), L                           DEFER4    113
      WRITE(6,150) L                                                      MAIN      622
  150 FORMAT(1H ,'WARNING-- IMPROPER MISSION DISPOSITION CODE-',I5)        MAIN      623
      GO TO 9010                                                          MAIN      624
C------------------------------------------------------------------------ MAIN      625
C               MISSION COMPLETED IN FULL.  A8 CODE WAS 1 OR 2.           MAIN      626
C------------------------------------------------------------------------ MAIN      627
 7070 I1=2                                                                MAIN      628
      I2=1                                                                MAIN      629
      GO TO 8090                                                          MAIN      630
C------------------------------------------------------------------------ MAIN      631
C               MISSION TRANSFERRED IN FULL.  A8 CODE WAS 6 OR 8.         MAIN      632
C------------------------------------------------------------------------ MAIN      633
 7080 I1=3                                                                MAIN      634
      I2=1                                                                MAIN      635
      GO TO 8090                                                          MAIN      636
C------------------------------------------------------------------------ DEFER      27
C               MISSION DEFERRED IN FULL.  A8 CODE WAS 5 OR 10.           DEFER      28
C------------------------------------------------------------------------ DEFER      29
 7085 I1=4                                                                DEFER      30
      I2=1                                                                DEFER      31
      GO TO 8090                                                          DEFER      32
C------------------------------------------------------------------------ MAIN      637
C               MISSION SKIPPED IN FULL.  A8 CODE WAS 7 OR 9.             MAIN      638
C------------------------------------------------------------------------ MAIN      639
 7090 I1=5                                                                DEFER      33
      I2=1                                                                MAIN      641
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      GO TO 8090                                                        MAIN      642
C-------------------------------------------------------------------- MAIN      643
C               MISSION COMPLETED IN PART.  A8 CODE WAS 3.              MAIN      644
C-------------------------------------------------------------------- MAIN      645
 8000 I1=6                                                              DEFER      34
      GO TO 9000                                                        MAIN      647
C-------------------------------------------------------------------- MAIN      648
C               ADDITIONAL FRACTIONAL MISSION COMPLETED.  A8 CODE WAS 12. DEFER    40
C-------------------------------------------------------------------- MAIN      650
 8010 I1=12                                                             DEFER      41
      I2=11                                                             DEFER      42
      I3=10                                                             DEFER      43
      GO TO 8080                                                        MAIN      654
C-------------------------------------------------------------------- DEFER      44
C               ADDITIONAL FRACTIONAL MISSION DEFERRED.  A8 CODE WAS 20. DEFER     45
C-------------------------------------------------------------------- DEFER      46
 8015 I1=13                                                             DEFER      47
      I2=11                                                             DEFER      48
      I3=10                                                             DEFER      49
      GO TO 8080                                                        DEFER      50
C-------------------------------------------------------------------- MAIN      655
C               ADDITIONAL FRACTIONAL MISSION SKIPPED.  A8 CODE WAS 13.  DEFER     51
C-------------------------------------------------------------------- MAIN      657
 8020 I1=14                                                             DEFER      52
      I2=11                                                             DEFER      53
      I3=10                                                             DEFER      54
      GO TO 8080                                                        MAIN      661
C-------------------------------------------------------------------- MAIN      662
C               ADDITIONAL MISSION COMPLETED IN FULL.  A8 CODE= 14 OR 16. DEFER    55
C-------------------------------------------------------------------- MAIN      664
 8030 I1=16                                                             DEFER      56
      I2=15                                                             DEFER      57
      I3=10                                                             DEFER      58
      GO TO 8080                                                        MAIN      668
C-------------------------------------------------------------------- MAIN      669
C               ADDITIONAL MISSION TRANSFERRED IN FULL. A8 CODE=21 OR 23. DEFER     59
C-------------------------------------------------------------------- MAIN      671
 8035 I1=17                                                             DEFER      60
      I2=15                                                             DEFER      61
      I3=10                                                             DEFER      62
      GO TO 8080                                                        MAIN      675
C-------------------------------------------------------------------- DEFER      63
C               ADDITIONAL MISSION DEFERRED IN FULL.  A8 CODE=22 OR 24.  DEFER     64
C-------------------------------------------------------------------- DEFER      65
 8038 I1=18                                                             DEFER      66
      I2=15                                                             DEFER      67
      I3=10                                                             DEFER      68
      GO TO 8080                                                        DEFER      69
C-------------------------------------------------------------------- MAIN      676
C               ADDITIONAL MISSION SKIPPED IN FULL.  A8 CODE WAS 15 OR 17 DEFER     70
C-------------------------------------------------------------------- MAIN      678
 8040 I1=19                                                             DEFER      71
      I2=15                                                             DEFER      72
      I3=10                                                             DEFER      73
      GO TO 8080                                                        MAIN      682
C-------------------------------------------------------------------- MAIN      683
C               ADDITIONAL MISSION SKIPPED IN PART.  A8 CODE WAS 26.    DEFER4    114
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C------------------------------------------------------------------ MAIN      686
 8050 I1=15                                                         DEFER      76
      I2=10                                                         DEFER      77
      GO TO 8090                                                    MAIN      689
C------------------------------------------------------------------ MAIN      690
C              ADDITIONAL MISSION COMPLETED IN PART.  A8 CODE WAS 18. DEFER      78
C------------------------------------------------------------------ MAIN      692
 8060 I1=20                                                         DEFER      79
      GO TO 9000                                                    MAIN      694
C------------------------------------------------------------------ MAIN      695
C              MISSION SKIPPED IN PART.  A8 CODE WAS 27.            DEFER      85
C------------------------------------------------------------------ MAIN      697
 8070 I1=1                                                          MAIN      698
      GO TO 9000                                                    MAIN      699
 8080 G(I3,1)=G(I3,1)+1.                                            MAIN      700
      G(I3,2)=G(I3,2)+A(I,5,K)                                      MAIN      701
      G(I3,4)=G(I3,4)+A(I,6,K)                                      MAIN      702
 8090 G(I2,1)=G(I2,1)+1.                                            MAIN      703
      G(I2,2)=G(I2,2)+A(I,5,K)                                      MAIN      704
      G(I2,4)=G(I2,4)+A(I,6,K)                                      MAIN      705
 9000 G(I1,1)=G(I1,1)+1.                                            MAIN      706
      G(I1,2)=G(I1,2)+A(I,5,K)                                      MAIN      707
      G(I1,4)=G(I1,4)+A(I,6,K)                                      MAIN      708
 9010 CONTINUE                                                      MAIN      709
C------------------------------------------------------------------ MAIN      710
C              ORIGINAL MISSIONS DEFERRED, TRANSFERRED, OR SKIPPED IN DEFER7      1
C                   PART.                                          DEFER7      2
C              ADDITIONAL WHOLE MISSIONS DEFERRED, TRANSFERRED, OR  DEFER7      3
C                   SKIPPED IN PART.                               DEFER7      4
C------------------------------------------------------------------ MAIN      715
      DO 9020 J=1,MCG                                               MAIN      716
      G(7,J)=D(1,J,K)                                               DEFER      86
      G(8,J)=D(2,J,K)                                               DEFER4    115
      G(9,J)=D(3,J,K)                                               DEFER4    116
      G(21,J)=D(4,J,K)                                              DEFER4    117
      G(22,J)=D(5,J,K)                                              DEFER4    118
      G(23,J)=D(6,J,K)                                              DEFER4    119
 9020 CONTINUE                                                      MAIN      721
      DO 9030 I=1,MRG                                               MAIN      722
      G(I,3)=100.*G(I,2)/(G(1,2)+G(10,2))                           DEFER      90
      G(I,5)=100.*G(I,4)/(G(1,4)+G(10,4))                           DEFER      91
 9030 CONTINUE                                                      MAIN      725
      DO 9040 I=1,MRG                                               MAIN      726
      G(I,2)=G(I,2)/10.                                             MAIN      727
      G(I,4)=G(I,4)/100.                                            MAIN      728
 9040 CONTINUE                                                      MAIN      729
      CALL OUT3                                                     MAIN      731
      CALL OUT5(K)                                                  DEFER5     11
      CALL OUT4(K)                                                  MAIN      732
      IF(IPLOT.EQ.0) GO TO 9050                                     MAIN      734
      CALL PLOT(K)                                                  MAIN      736
 9050 WRITE(6,110)                                                  MAIN      738
10000 CONTINUE                                                      MAIN      739
      GO TO 1000                                                    MAIN      740
      END                                                           MAIN      741
```

```
E SORT       76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

C*****************************************************************************  SORT      2
C                                                                               SORT      3
C**** SUBROUTINE SORT                                                           SORT      4
C        SORT TIMES FOR THE POOL.                                               SORT      5
C                                                                               SORT      6
C*****************************************************************************  SORT      7
      SUBROUTINE SORT(K)                                                        SORT      8
      DIMENSION  T(100,9,25), A(500,9,25), E(1000,2,25), P(15,25)               SORT1     1
      DIMENSION  D(500,9), F(500,2,25)                                          SORT1     2
      INTEGER P                                                                 SORT     11
      LEVEL 2, T,A,F,E,D                                                        SORT     12
      COMMON / AAA / A                                                          SORT1     3
      COMMON / BBB / D,E,F,T                                                    SORT1     4
      COMMON / MAX / MMISS,MLINK                                                SORT     14
      COMMON / PPP / P                                                          SORT     15
C                                                                               SORT     16
C                                                                               SORT     17
      KS=INT(F(MMISS,1,K))                                                      SORT     18
      IF(KS.EQ.2) GO TO 500                                                     SORT     19
      IF(KS.GE.3) GO TO 200                                                     SORT     20
      F(MMISS,1,K)=2.                                                           SORT     21
  200 JM=2*P(7,K)                                                               SORT     22
      IM=JM-1                                                                   SORT     23
      DO 400 I=1,IM                                                             SORT     24
      I1=I+1                                                                    SORT     25
      DO 300 J=I1,JM                                                            SORT     26
      IF(E(I,1,K).LT.E(J,1,K)) GO TO 300                                        SORT     27
      IF(E(I,1,K).GT.E(J,1,K)) GO TO 210                                        SORT     28
      IF(E(I,2,K).LE.E(J,2,K)) GO TO 300                                        SORT     29
      GO TO 250                                                                 SORT     30
  210 TEMP=E(I,1,K)                                                             SORT     31
      E(I,1,K)=E(J,1,K)                                                         SORT     32
      E(J,1,K)=TEMP                                                             SORT     33
  250 TEMP=E(I,2,K)                                                             SORT     34
      E(I,2,K)=E(J,2,K)                                                         SORT     35
      E(J,2,K)=TEMP                                                             SORT     36
  300 CONTINUE                                                                  SORT     37
  400 CONTINUE                                                                  SORT     38
  500 RETURN                                                                    SORT     39
      END                                                                       SORT     40
```

```
: REMAIN     76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

C*********************************************************************** REMAIN      1
C                                                                        REMAIN      2
C**** SUBROUTINE REMAIN                                                  REMAIN      3
C         FIND THE AMOUNT OF CARGO REMAINING FROM A SPLIT MISSION.       REMAIN      4
C                                                                        REMAIN      5
C*********************************************************************** REMAIN      6
      SUBROUTINE REMAIN(K)                                               REMAIN      7
      DIMENSION  A(500,9,25), P(15,25)                                   REMAIN      8
      DIMENSION  C(500,25)                                               REMAIN      9
      LEVEL 2, A,C                                                       REMAIN     10
      INTEGER P                                                          REMAIN     11
      COMMON /     / NPOOLS,NY,B5,B6,NTRCK                               REMAIN     12
      COMMON / AAA / A                                                   REMAIN     13
      COMMON / CCC / C                                                   REMAIN     14
      COMMON / PPP / P                                                   REMAIN     15
C                                                                        REMAIN     16
C                                                                        REMAIN     17
      N=NY                                                               REMAIN     18
      B5=A(N,5,K)-B5                                                     REMAIN     19
      B6=A(N,6,K)-B6                                                     REMAIN     20
C---------------------------------------------------------------------- REMAIN     21
C         FIND THE AMOUNT OF TRUCK CAPACITY NEEDED TO HAUL THE REMAINING REMAIN     22
C              CARGO.                                                    REMAIN     23
C---------------------------------------------------------------------- REMAIN     24
      U=100.*AMAX1(B5/FLOAT(P(3,K)),B6/FLOAT(P(4,K)))                    REMAIN     25
      C(N,K)=U                                                           REMAIN     26
C---------------------------------------------------------------------- REMAIN     27
C         FIND THE NUMBER OF TRUCKS REQUIRED.                            REMAIN     28
C---------------------------------------------------------------------- REMAIN     29
      NTRCK=INT(U/100.)                                                  REMAIN     30
      IF(AMOD(U,100.).NE.0.) NTRCK=NTRCK+1                               REMAIN     31
      RETURN                                                             REMAIN     32
      END                                                                REMAIN     33
```

```
PSTPN      76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

C*********************************************************************** PSTPN        1
C                                                                        PSTPN        2
C**** SUBROUTINE PSTPN                                                   PSTPN        3
C         POSTPONE THE MISSION UNTIL ENOUGH TIME AND VEHICLES ARE        PSTPN        4
C              AVAILABLE.                                                PSTPN        5
C                                                                        PSTPN        6
C*********************************************************************** PSTPN        7
      SUBROUTINE PSTPN(K,IRT)                                            PSTPN        8
      DIMENSION  T(100,9,25), A(500,9,25), E(1000,2,25), P(15,25)        PSTPN        9
      DIMENSION  D(500,9), F(500,2,25)                                   PSTPN       10
      DIMENSION  B(500,2,25), DT(6,25)                                   PSTPN1       1
      INTEGER P                                                          PSTPN       12
      LEVEL 2, T,A,F,E,D,B                                               PSTPN       13
      COMMON /     / NPOOLS,NY,B5,B6,NTRCK                               PSTPN       14
      COMMON / AAA / A                                                   PSTPN       15
      COMMON / BBB / D,E,F,T                                             PSTPN       16
      COMMON / DDD / ITRNS,TRTM,DFTM,NCE,IB,NZ3,DT                       PSTPN1       2
      COMMON / EEE / B                                                   PSTPN       18
      COMMON / PPP / P                                                   PSTPN       19
C                                                                        PSTPN       20
C                                                                        PSTPN       21
      I=NCE                                                              PSTPN       22
      N=NY                                                               PSTPN       23
      IRT=0                                                              PSTPN       24
C---------------------------------------------------------------------- PSTPN       26
C         ARE THERE ENOUGH TRUCKS ASSIGNED TO THE POOL TO COMPLETE THE   PSTPN       27
C              MISSION EVEN IF IT IS POSTPONED.                          PSTPN       28
C---------------------------------------------------------------------- PSTPN       29
      IF(NTRCK.GT.P(5,K)) RETURN                                         PSTPN       30
C---------------------------------------------------------------------- PSTPN       31
C         IS IT PERMISSIBLE TO POSTPONE THE MISSION.                     PSTPN       32
C---------------------------------------------------------------------- PSTPN       33
      IF(A(N,9,K).EQ.0.) RETURN                                          PSTPN       34
C---------------------------------------------------------------------- PSTPN       35
C         IS IT TO BE TRANSFERRED AT ONCE (NO DELAY).                    PSTPN       36
C---------------------------------------------------------------------- PSTPN       37
      IF(ITRNS.LT.0 .AND. A(N,7,K).GT.0.) RETURN                         PSTPN       38
C---------------------------------------------------------------------- PSTPN       39
C         FIND THE CRITICAL DELAY TIME.                                  PSTPN       40
C---------------------------------------------------------------------- PSTPN       41
      DELAY=DFTM                                                         PSTPN       42
      IF(ITRNS.EQ.0 .AND. A(N,7,K).GT.0.) DELAY=TRTM                     PSTPN       43
C---------------------------------------------------------------------- PSTPN       44
C         IF OTHER MISSIONS HAVE BEEN COMPLETED LATER THAN SCHEDULED,    PSTPN       45
C              ARRANGE THE DISPATCH TIMES IN CHRONOLOGICAL ORDER.        PSTPN       46
C---------------------------------------------------------------------- PSTPN       47
      IF(IB.GT.1) CALL SEQ(K)                                            PSTPN       48
C---------------------------------------------------------------------- PSTPN       49
C         WHAT IS THE CURRENT TIME.                                      PSTPN       50
C---------------------------------------------------------------------- PSTPN       51
      CTIME=E(I,1,K)                                                     PSTPN       52
C---------------------------------------------------------------------- PSTPN       53
C         HOW MANY TRUCKS ARE CURRENTLY OCCUPIED.                        PSTPN       54
C---------------------------------------------------------------------- PSTPN       55
      NOCC=P(8,K)                                                        PSTPN       56
C---------------------------------------------------------------------- PSTPN       57
C         HOW MANY EVENTS REMAIN.                                        PSTPN       58
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PSTPN      76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

C-------------------------------------------------------------------- PSTPN      59
      NOE=2*P(7,K)                                                    PSTPN      60
      NXT=NCE+1                                                       PSTPN      61
      IF(NXT.GE.NOE) RETURN                                           PSTPN      62
C-------------------------------------------------------------------- PSTPN      63
C          CHECK THE REMAINING EVENTS FOR A SLACK PERIOD.             PSTPN      64
C-------------------------------------------------------------------- PSTPN      65
      DO 5000 J=NXT,NOE                                               PSTPN      66
      NW=INT(ABS(E(J,2,K)))                                           PSTPN      67
      NT=INT(F(NW,2,K)/100.)                                          PSTPN      68
      IF(AMOD(F(NW,2,K),100.).NE.0.) NT=NT+1                          PSTPN      69
      IF(E(J,2,K).LT.0.) GO TO 500                                    PSTPN      70
      NOCC=NOCC+NT                                                    PSTPN      71
      GO TO 5000                                                      PSTPN      72
  500 TMNXT=E(J,1,K)                                                  PSTPN      73
      NOCC=NOCC-NT                                                    PSTPN      74
C-------------------------------------------------------------------- PSTPN      75
C          ARE THERE ENOUGH TRUCKS AVAILABLE.                         PSTPN      76
C-------------------------------------------------------------------- PSTPN      77
      IF(NOCC+NTRCK.GT.P(5,K)) GO TO 5000                             PSTPN      78
C-------------------------------------------------------------------- PSTPN      79
C          IS IT TOO LATE.                                            PSTPN      80
C-------------------------------------------------------------------- PSTPN      81
      IF(E(J,1,K).GT.CTIME+DELAY) GO TO 6000                          PSTPN3      1
      TMLST=TMNXT                                                     PSTPN      83
      NCC=NOCC                                                        PSTPN      84
      NJ=J+1                                                          PSTPN      85
C-------------------------------------------------------------------- PSTPN      86
C          IS THERE ENOUGH TIME TO COMPLETE THIS MISSION BEFORE THE   PSTPN      87
C               TRUCKS WILL BE NEEDED FOR ANOTHER MISSION.            PSTPN      88
C-------------------------------------------------------------------- PSTPN      89
      DO 4000 J1=NJ,NOE                                               PSTPN      90
      IF(J1.EQ.NOE) GO TO 1050                                        PSTPN      91
      NX=INT(ABS(E(J1,2,K)))                                          PSTPN      92
      NT=INT(F(NX,2,K)/100.)                                          PSTPN      93
      IF(AMOD(F(NX,2,K),100.).NE.0.) NT=NT+1                          PSTPN      94
      IF(E(J1,2,K).LT.0.) GO TO 3500                                  PSTPN      95
      NCC=NCC+NT                                                      PSTPN      96
C-------------------------------------------------------------------- PSTPN      97
C          PERHAPS THERE WILL STILL BE ENOUGH TRUCKS.                 PSTPN      98
C-------------------------------------------------------------------- PSTPN      99
      IF(NCC+NTRCK.LE.P(5,K)) GO TO 4000                              PSTPN     100
C-------------------------------------------------------------------- PSTPN     101
C          CHECK THE TIME GAP TO SEE IF THERE IS ENOUGH TIME TO PERFORM PSTPN     102
C               THE MISSION AND CHECK TO ENSURE THAT THE TIME GAP HASN'T PSTPN     103
C               BEEN FILLED WITH OTHER POSTPONED MISSIONS.            PSTPN     104
C-------------------------------------------------------------------- PSTPN     105
 1050 TMNXT=E(J1,1,K)                                                 PSTPN     106
      IF(TMNXT-TMLST.LT.F(N,1,K)) GO TO 5000                          PSTPN     107
      IF(IB.EQ.0) GO TO 3000                                          PSTPN     108
      DO 2000 J2=1,IB                                                 PSTPN     109
      IF(B(J2,1,K).LE.TMLST .AND. B(J2,2,K).GE.TMNXT) GO TO 5000      PSTPN     110
      IF(B(J2,1,K).GE.TMNXT) GO TO 3000                               PSTPN     111
      IF(B(J2,2,K).LE.TMLST) GO TO 2000                               PSTPN     112
      IF(B(J2,1,K)-TMLST.GE.F(N,1,K)) GO TO 3000                      PSTPN     113
      TMLST=B(J2,2,K)                                                 PSTPN     114
      IF(TMNXT-TMLST.LT.F(N,1,K)) GO TO 5000                          PSTPN     115
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PSTPN      76/76   OPT=1 ROUND=+-*/              FTN 4.8+508        09/18/80  09.54.

C------------------------------------------------------------------- PSTPN     116
C          IS IT TOO LATE.                                          PSTPN     117
C------------------------------------------------------------------- PSTPN     118
      IF(TMLST.GT.CTIME+DELAY) GO TO 6000                           PSTPN3      2
 2000 CONTINUE                                                      PSTPN     120
C------------------------------------------------------------------- PSTPN     121
C          THERE IS ENOUGH TIME AND THERE ARE ENOUGH TRUCKS FOR THE PSTPN     122
C               MISSION TO BE COMPLETED.                            PSTPN     123
C          RESET THE MISSION DISPATCH AND RETURN TIMES.             PSTPN     124
C------------------------------------------------------------------- PSTPN     125
 3000 IB=IB+1                                                       PSTPN1      3
      DT(1,K)=FLOAT(IB)                                             PSTPN1      4
      DT(2,K)=DT(2,K)+(TMLST-E(I,1,K))                              PSTPN1      5
      DT(3,K)=DT(3,K)+FLOAT(NTRCK)                                  PSTPN1      6
      DT(4,K)=DT(4,K)+B5                                            PSTPN1      7
      DT(5,K)=DT(5,K)+B6                                            PSTPN1      8
      E(I,1,K)=TMLST                                                PSTPN1      9
      DO 3200 I7=NXT,NOE                                            PSTPN     127
      IF(-E(I7,2,K).EQ.N) GO TO 3300                                PSTPN     128
 3200 CONTINUE                                                      PSTPN     129
      RETURN                                                        PSTPN     130
 3300 E(I7,1,K)=TMLST+F(N,1,K)                                      PSTPN     131
      B(IB,1,K)=E(I,1,K)                                            PSTPN     133
      B(IB,2,K)=E(I7,1,K)                                           PSTPN     134
      IZ3=NOCC+NTRCK                                                PSTPN     135
      NZ3=MAXO(NZ3,IZ3)                                             PSTPN     136
      IRT=1                                                         PSTPN     137
      IF(A(N,8,K).GE.26.) A(N,7,K)=-1.                              PSTPN     138
      RETURN                                                        PSTPN     139
 3500 NCC=NCC-NT                                                    PSTPN     140
 4000 CONTINUE                                                      PSTPN     141
 5000 CONTINUE                                                      PSTPN     142
 6000 IF(A(N,7,K).LE.0.) RETURN                                     PSTPN3      3
      E(I,1,K)=E(I,1,K)+DELAY                                       PSTPN3      4
      DO 6100 I7=NXT,NOE                                            PSTPN3      5
      IF(-E(I7,2,K).EQ.N) GO TO 6200                                PSTPN3      6
 6100 CONTINUE                                                      PSTPN3      7
      RETURN                                                        PSTPN3      8
 6200 E(I7,1,K)=E(I,1,K)+F(N,1,K)                                   PSTPN3      9
      RETURN                                                        PSTPN     143
      END                                                           PSTPN     144
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SEQ        76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

C*************************************************************************** SEQ          1
C                                                                             SEQ          2
C**** SUBROUTINE SEQ                                                          SEQ          3
C          SORT DISPATCH TIMES FOR POSTPONED MISSIONS.                        SEQ          4
C                                                                             SEQ          5
C*************************************************************************** SEQ          6
      SUBROUTINE SEQ(K)                                                       SEQ          7
      DIMENSION  B(500,2,25)                                                  SEQ          8
      LEVEL 2, B                                                              SEQ          9
      COMMON / DDD / ITRNS,TRTM,DFTM,NCE,IB,NZ3                               SEQ         10
      COMMON / EEE / B                                                        SEQ         11
C                                                                             SEQ         12
C                                                                             SEQ         13
      IF(IB.LE.1) RETURN                                                      SEQ         14
      JM=IB                                                                   SEQ         15
      IM=JM-1                                                                 SEQ         16
      DO 200 I=1,IM                                                           SEQ         17
      I1=I+1                                                                  SEQ         18
      DO 100 J=I1,JM                                                          SEQ         19
      IF(B(I,1,K).LT.B(J,1,K)) GO TO 100                                      SEQ         20
      TEMP=B(I,1,K)                                                           SEQ         21
      B(I,1,K)=B(J,1,K)                                                       SEQ         22
      B(J,1,K)=TEMP                                                           SEQ         23
  100 CONTINUE                                                                SEQ         24
  200 CONTINUE                                                                SEQ         25
      RETURN                                                                  SEQ         26
      END                                                                     SEQ         27
```

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 STRMSS     76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

C*********************************************************************** STRMSS      1
C                                                                        STRMSS      2
C**** SUBROUTINE STRMSS                                                  STRMSS      3
C         STORE, FOR REPORTING LATER, THE INFO ON PARTIAL MISSIONS       STRMSS      4
C              SKIPPED OR TRANSFERRED.  EACH IS THE REMAINDER OF A SPLIT STRMSS      5
C              MISSION.                                                  STRMSS      6
C                                                                        STRMSS1     1
C*********************************************************************** STRMSS     7
      SUBROUTINE STRMSS(K)                                               STRMSS      8
      DIMENSION  A(500,9,25), D(6,5,25), P(15,25)                        STRMSS2     1
      LEVEL 2, A                                                         STRMSS1     3
      INTEGER P                                                          STRMSS2     2
      COMMON /     / NPOOLS,NY,B5,B6,NTRCK                               STRMSS1     4
      COMMON / AAA / A                                                   STRMSS1     5
      COMMON / DDD / D                                                   STRMSS     13
      COMMON / PPP / P                                                   STRMSS2     3
C                                                                        STRMSS     14
C                                                                        STRMSS     15
      N=NY                                                               STRMSS1     6
      IF(A(N,8,K).LT.26.) RETURN                                         STRMSS1     7
      IF(A(N,7,K).LE.0.) GO TO 50                                        STRMSS2     4
      T7=A(N,7,K)-100.*FLOAT(INT(A(N,7,K)/100.))                         STRMSS2     5
      DO 25 KK=1,NPOOLS                                                  STRMSS2     6
      IF(INT(T7).EQ.P(1,KK)) GO TO 35                                    STRMSS2     7
   25 CONTINUE                                                           STRMSS2     8
      RETURN                                                             STRMSS2     9
   35 IF(KK.LE.K) A(N,7,K)=0.                                            STRMSS2    10
C---------------------------------------------------------------------- STRMSS     22
C         STORE THE MISSION INFO.                                        STRMSS     23
C              L1=1 -- ORIGINAL MISSION TO BE TRANSFERRED,               STRMSS     24
C              L1=2 -- ORIGINAL MISSION COMPLETED AFTER DEFERMENT,       STRMSS1     8
C              L1=3 -- ORIGINAL MISSION TO BE SKIPPED,                   STRMSS1     9
C              L1=4 -- ADDITIONAL MISSION TO BE TRANSFERRED,             STRMSS1    10
C              L1=5 -- ADDITIONAL MISSION COMPLETED AFTER DEFERMENT,     STRMSS1    11
C              L1=6 -- ADDITIONAL MISSION TO BE SKIPPED.                 STRMSS1    12
C---------------------------------------------------------------------- STRMSS     28
   50 IF(A(N,8,K).EQ.26.) GO TO 100                                      STRMSS2    11
      L1=1                                                               STRMSS     30
      IF(A(N,7,K).LT.0.) L1=2                                            STRMSS1    14
      IF(A(N,7,K).EQ.0.) L1=3                                            STRMSS1    15
      GO TO 200                                                          STRMSS     32
  100 L1=4                                                               STRMSS1    16
      IF(A(N,7,K).LT.0.) L1=5                                            STRMSS1    17
      IF(A(N,7,K).EQ.0.) L1=6                                            STRMSS1    18
  200 D(L1,1,K)=D(L1,1,K)+1.                                             STRMSS     35
      D(L1,2,K)=D(L1,2,K)+B5                                             STRMSS     36
      D(L1,4,K)=D(L1,4,K)+B6                                             STRMSS     37
      RETURN                                                             STRMSS     38
      END                                                                STRMSS     39
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TRNSFR    76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

C*********************************************************************** TRNSFR      1
C                                                                        TRNSFR      2
C**** SUBROUTINE TRNSFR                                                  TRNSFR      3
C         STORE, FOR TRANSFER LATER, INFO ON MISSIONS TO BE TAKEN BY     TRNSFR      4
C              OTHER POOLS.  INCLUDES WHOLE MISSIONS AND REMAINDERS OF   TRNSFR      5
C              SPLIT MISSIONS.                                           TRNSFR      6
C                                                                        TRNSFR1     1
C*********************************************************************** TRNSFR      7
      SUBROUTINE TRNSFR(K)                                               TRNSFR      8
      DIMENSION  T(100,9,25), A(500,9,25), E(1000,2,25), P(15,25)        TRNSFR1     2
      DIMENSION  D(500,9), F(500,2,25)                                   TRNSFR1     3
      INTEGER P                                                          TRNSFR     11
      LEVEL 2, T,A,F,E,D                                                 TRNSFR     12
      COMMON /     / NPOOLS,NY,B5,B6,NTRCK                               TRNSFR1     4
      COMMON / AAA / A                                                   TRNSFR1     5
      COMMON / BBB / D,E,F,T                                             TRNSFR1     6
      COMMON / PPP / P                                                   TRNSFR     16
      COMMON / MCOL/ MCT,MCA,MCG                                         TRNSFR     17
   10 FORMAT(1HO,'IMPROPER MISSION DISPOSITION CODE,',I3,', IN POOL NO.  TRNSFR     18
     *',I3)                                                              TRNSFR     19
C                                                                        TRNSFR     20
C                                                                        TRNSFR     21
      N=NY                                                               TRNSFR1     7
C---------------------------------------------------------------------- TRNSFR     23
C         IS MISSION TRANSFER PERMITTED.                                 TRNSFR     24
C---------------------------------------------------------------------- TRNSFR     25
      IF(A(N,7,K).LE.0.) RETURN                                          TRNSFR1     8
      T7=A(N,7,K)-100.*FLOAT(INT(A(N,7,K)/100.))                         TRNSFR2     1
      DO 25 KK=1,NPOOLS                                                  TRNSFR2     2
      IF(INT(T7).EQ.P(1,KK)) GO TO 35                                    TRNSFR2     3
   25 CONTINUE                                                           TRNSFR2     4
      RETURN                                                             TRNSFR2     5
   35 IF(KK.LE.K) RETURN                                                 TRNSFR2     6
C---------------------------------------------------------------------- TRNSFR     27
C         INCREASE THE COUNTER FOR NUMBER OF MISSIONS TO BE TRANSFERRED. TRNSFR     28
C---------------------------------------------------------------------- TRNSFR     29
      P(11,K)=P(11,K)+1                                                  TRNSFR     30
      IP=P(11,K)                                                         TRNSFR     31
C---------------------------------------------------------------------- TRNSFR     32
C         STORE THE MISSION INFO.                                        TRNSFR     33
C---------------------------------------------------------------------- TRNSFR     34
      DO 100 J=1,MCA                                                     TRNSFR     35
      D(IP,J)=A(N,J,K)                                                   TRNSFR1     9
  100 CONTINUE                                                           TRNSFR     37
C---------------------------------------------------------------------- TRNSFR     38
C         CHANGE THE MISSION DISPOSITION CODE.                           TRNSFR     39
C---------------------------------------------------------------------- TRNSFR     40
      I8=INT(A(N,8,K))                                                   TRNSFR1    10
      IF(I8.GT.25) GO TO 300                                             TRNSFR     42
      I8N=6                                                              TRNSFR     43
      IF(I8.EQ.7) GO TO  200                                             TRNSFR     44
      I8N=8                                                              TRNSFR     45
      IF(I8.EQ.9) GO TO  200                                             TRNSFR     46
      I8N=21                                                             TRNSFR     47
      IF(I8.EQ.15) GO TO 200                                             TRNSFR     48
      I8N=23                                                             TRNSFR     49
      IF(I8.EQ.17) GO TO 200                                             TRNSFR     50
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TRNSFR      76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

      WRITE(6,10) I8,K                                                  TRNSFR      51
      STOP                                                              TRNSFR      52
  200 A(N,8,K)=FLOAT(I8N)                                               TRNSFR1     11
      GO TO 400                                                         TRNSFR      54
C-----------------------------------------------------------------------TRNSFR      55
C         FOR THE REMAINDERS OF SPLIT MISSIONS STORE REMAINING CARGO     TRNSFR      56
C              AND CHANGE MISSION DISPOSITION CODE.                     TRNSFR      57
C-----------------------------------------------------------------------TRNSFR      58
  300 D(IP,5)=B5                                                        TRNSFR      59
      D(IP,6)=B6                                                        TRNSFR      60
      I8N=4                                                             TRNSFR      61
      IF(I8.EQ.27) GO TO 400                                            TRNSFR      62
      I8N=19                                                            TRNSFR      63
      IF(I8.EQ.26) GO TO 400                                            TRNSFR      64
      WRITE(6,10) I8,K                                                  TRNSFR      65
      STOP                                                              TRNSFR      66
  400 D(IP,8)=FLOAT(I8N)                                                TRNSFR      67
      RETURN                                                            TRNSFR      68
      END                                                               TRNSFR      69
```

```
E MVMSSN     76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

C*********************************************************************** MVMSSN      1
C                                                                        MVMSSN      2
C**** SUBROUTINE MVMSSN                                                  MVMSSN      3
C         EXECUTE THE TRANSFER OF MISSIONS TO OTHER POOLS.               MVMSSN      4
C                                                                        MVMSSN1     1
C*********************************************************************** MVMSSN      5
      SUBROUTINE MVMSSN(K)                                               MVMSSN      6
      DIMENSION  T(100,9,25), A(500,9,25), E(1000,2,25), P(15,25)        MVMSSN1     2
      DIMENSION  D(500,9), F(500,2,25)                                   MVMSSN1     3
      INTEGER P                                                          MVMSSN      9
      LEVEL 2, T,A,F,E,D                                                 MVMSSN     10
      COMMON /     / NPOOLS,NY,B5,B6,NTRCK                               MVMSSN1     4
      COMMON / AAA / A                                                   MVMSSN1     5
      COMMON / BBB / D,E,F,T                                             MVMSSN1     6
      COMMON / PPP / P                                                   MVMSSN     14
      COMMON / MCOL/ MCT,MCA,MCG                                         MVMSSN     15
      COMMON / MAX / MMISS,MLINK                                         MVMSSN     16
   10 FORMAT(1H1)                                                        MVMSSN     17
   11 FORMAT(1H ,125(1HX))                                               MVMSSN     18
   14 FORMAT(1H ,'WARNING--- MISSION OVERFLOW IN POOL',I3,10X,'TRUNCATED MVMSSN     19
     * AT ',I4,' MISSIONS')                                             MVMSSN     20
C                                                                        MVMSSN     21
C                                                                        MVMSSN     22
      NTRANS=P(11,K)                                                     MVMSSN     23
      IF(NTRANS.EQ.0) RETURN                                             MVMSSN     24
      IF(K.GE.NPOOLS) RETURN                                             MVMSSN2     1
      KP=K+1                                                             MVMSSN3     1
      DO 500 KK=KP,NPOOLS                                                MVMSSN2     3
      DO 400 NN=1,NTRANS                                                 MVMSSN     28
C---------------------------------------------------------------------- MVMSSN1     7
C         FIND THE POOL TO WHICH THIS MISSION IS TO BE TRANSFERRED.      MVMSSN1     8
C---------------------------------------------------------------------- MVMSSN1     9
      T7=D(NN,7)-100.*FLOAT(INT(D(NN,7)/100.))                           MVMSSN     29
      IF(INT(T7).NE.P(1,KK)) GO TO 400                                   MVMSSN2     4
      IF(P(7,KK).LT.MMISS) GO TO 200                                     MVMSSN     31
      WRITE(6,10)                                                        MVMSSN     32
      WRITE(6,11)                                                        MVMSSN     33
      WRITE(6,14) KK,P(7,KK)                                             MVMSSN     34
      WRITE(6,11)                                                        MVMSSN     35
      GO TO 500                                                          MVMSSN     36
  200 P(7,KK)=P(7,KK)+1                                                  MVMSSN     37
      I7=P(7,KK)                                                         MVMSSN     38
C---------------------------------------------------------------------- MVMSSN1    11
C         ADD THE INFO FOR THIS MISSION TO THAT FOR THE OTHER MISSIONS   MVMSSN1    12
C              ASSIGNED TO THE POOL.                                     MVMSSN1    13
C---------------------------------------------------------------------- MVMSSN1    14
      DO 300 J=1,MCA                                                     MVMSSN     39
      A(I7,J,KK)=D(NN,J)                                                 MVMSSN     40
  300 CONTINUE                                                           MVMSSN     41
      A(I7,7,KK)=FLOAT(INT(D(NN,7)/100.))                                MVMSSN     42
C---------------------------------------------------------------------- MVMSSN     43
C         MISSION WILL NOT BE TRANSFERRED TO YET ANOTHER POOL.           MVMSSN     44
C              (THIS OVERRIDES THE PREVIOUS ASSIGNMENT).                 MVMSSN     45
C---------------------------------------------------------------------- MVMSSN     46
      A(I7,7,KK)=0.                                                      MVMSSN     47
  400 CONTINUE                                                           MVMSSN     48
  500 CONTINUE                                                           MVMSSN     49
```

```
F MVMSSN      76/76   OPT=1 ROUND=+-*/                FTN 4.8+508          09/18/80  09.54.

      RETURN                                                                MVMSSN      50
      END                                                                   MVMSSN      51
```

```
E OUT1       76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

C*************************************************************************** OUT1        2
C                                                                             OUT1        3
C**** SUBROUTINE OUT1                                                         OUT1        4
C         PRINT OUT INPUT DATA FOR THE POOL.                                  OUT1        5
C                                                                             OUT1        6
C*************************************************************************** OUT1        7
      SUBROUTINE OUT1(K)                                                      OUT1        8
      DIMENSION  T(100,9,25), A(500,9,25), E(1000,2,25), P(15,25)             DEFER4    120
      DIMENSION  D(500,9), F(500,2,25)                                        DEFER4    121
      INTEGER P                                                               OUT1       11
      LEVEL 2, T,A,F,E,D                                                      OUT1       12
      COMMON / AAA / A                                                        DEFER4    122
      COMMON / BBB / D,E,F,T                                                  DEFER4    123
      COMMON / MCOL/ MCT,MCA,MCG                                              OUT1       14
      COMMON / PPP / P                                                        OUT1       15
    5 FORMAT(1H )                                                             OUT1       16
   10 FORMAT(1H1)                                                             OUT1       17
   20 FORMAT(1H ,125(1HX))                                                    OUT1       18
  100 FORMAT(1H ,125(1H-))                                                    OUT1       19
  110 FORMAT(1HO)                                                             OUT1       20
C                                                                             OUT1       21
C                                                                             OUT1       22
      WRITE(6,10)                                                             OUT1       23
      WRITE(6,20)                                                             OUT1       24
      WRITE(6,30) P(1,K)                                                      OUT1       25
   30 FORMAT(1HO,10X,'POOL NUMBER     ',I5)                                   OUT1       26
      WRITE(6,40) P(2,K)                                                      OUT1       27
   40 FORMAT(1H ,10X,'VEHICLE NUMBER  ',I5)                                   OUT1       28
      WRITE(6,50) P(3,K)                                                      OUT1       29
   50 FORMAT(1H ,10X,'VEH. PAY.(STX10)',I5)                                   OUT1       30
      WRITE(6,60) P(4,K)                                                      OUT1       31
   60 FORMAT(1H ,10X,'VEH. CUBIC CAP. ',I5)                                   OUT1       32
      WRITE(6,70) P(5,K)                                                      OUT1       33
   70 FORMAT(1H ,10X,'NO. OF VEHICLES ',I5)                                   OUT1       34
      WRITE(6,80) P(6,K)                                                      OUT1       35
   80 FORMAT(1H ,10X,'NUMBER OF LINKS ',I5)                                   OUT1       36
      WRITE(6,90) P(7,K)                                                      OUT1       37
   90 FORMAT(1H ,10X,'NO. OF MISSIONS ',I5)                                   OUT1       38
      WRITE(6,100)                                                            OUT1       39
      WRITE(6,110)                                                            OUT1       40
      WRITE(6,115)                                                            OUT1       41
  115 FORMAT(1HO,59X,'LINKS')                                                 OUT1       42
      WRITE(6,116)                                                            OUT1       43
  116 FORMAT(1H ,59X,'-----')                                                 OUT1       44
      WRITE(6,5)                                                              OUT1       45
      WRITE(6,120)                                                            OUT1       46
  120 FORMAT(1H ,20X,'C1        C2        C3        C4        C5              OUT1       47
     *C6        C7        C8        C9')                                     OUT1       48
      WRITE(6,130)                                                            OUT1       49
  130 FORMAT(1H ,'T(R,C)',7X,'/','-------------------------------------- OUT1       50
     *-------------------------------------------------')                     OUT1       51
      N=P(6,K)                                                                OUT1       52
      IF(N.GT.0) GO TO 135                                                    OUT1       53
      WRITE(6,133)                                                            OUT1       54
  133 FORMAT(1HO,51X,'NO LINKS ASSIGNED')                                     OUT1       55
      GO TO 153                                                               OUT1       56
  135 DO 150 I=1,N                                                            OUT1       57
```

```
E OUT1       76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

      WRITE(6,140) I,(T(I,J,K),J=1,MCT)                                  OUT1       58
  140 FORMAT(1H ,6X,'R',I3,3X,'/',9F10.1)                                OUT1       59
  150 CONTINUE                                                           OUT1       60
  153 WRITE(6,110)                                                       OUT1       61
      WRITE(6,110)                                                       OUT1       62
      WRITE(6,155)                                                       OUT1       63
  155 FORMAT(1HO,57X,'MISSIONS')                                         DEFER4    124
      WRITE(6,156)                                                       OUT1       65
  156 FORMAT(1H ,57X,'---------')                                        DEFER4    125
      WRITE(6,5)                                                         OUT1       67
      WRITE(6,120)                                                       DEFER4    126
      WRITE(6,160)                                                       OUT1       71
  160 FORMAT(1H ,'A(R,C)',7X,'/','------------------------------------- DEFER4    127
     *-------------------------------------------------')               DEFER4    128
      N=P(7,K)                                                           OUT1       74
      IF(N.GT.0) GO TO 164                                               OUT1       75
      WRITE(6,163)                                                       OUT1       76
  163 FORMAT(1HO,47X,'NO MISSIONS ASSIGNED')                             OUT1       77
      GO TO 175                                                          OUT1       78
  164 DO 170 I=1,N                                                       OUT1       79
      WRITE(6,140) I,(A(I,J,K),J=1,MCA)                                  DEFER4    129
  170 CONTINUE                                                           OUT1       82
  175 WRITE(6,110)                                                       OUT1       83
      WRITE(6,110)                                                       OUT1       84
      WRITE(6,20)                                                        OUT1       85
      RETURN                                                             OUT1       86
      END                                                                OUT1       87
```

```
E OUT2        76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

C*********************************************************************** OUT2        2
C                                                                         OUT2        3
C**** SUBROUTINE OUT2                                                     OUT2        4
C        PRINT HEADING FOR OUTPUT FROM SIMULATION.                        OUT2        5
C                                                                         OUT2        6
C*********************************************************************** OUT2        7
      SUBROUTINE OUT2(K)                                                  OUT2        8
      DIMENSION  P(15,25)                                                 DEFER     100
      INTEGER P                                                           OUT2       10
      COMMON / PPP / P                                                    OUT2       11
C                                                                         OUT2       13
C                                                                         OUT2       14
      WRITE(6,10) P(1,K)                                                  OUT2       15
   10 FORMAT(1HO,10X,'OUTPUT FOR POOL NO.     ',I5)                       OUT2       16
      WRITE(6,20) P(2,K)                                                  OUT2       17
   20 FORMAT(1H ,10X,'VEHICLE NUMBER          ',I5)                       OUT2       18
      WRITE(6,30) P(3,K)                                                  OUT2       19
   30 FORMAT(1H ,10X,'VEHICLE PAYLOAD (STX10)',I5)                        OUT2       20
      WRITE(6,40) P(4,K)                                                  OUT2       21
   40 FORMAT(1H ,10X,'VEHICLE CUBIC CAPACITY ',I5)                        OUT2       22
      WRITE(6,50) P(5,K)                                                  OUT2       23
   50 FORMAT(1H ,10X,'NO. OF VEHICLES IN POOL',I5)                        OUT2       24
      IF(P(7,K).GT.0) GO TO 100                                           OUT2       25
      WRITE(6,60)                                                         OUT2       26
   60 FORMAT(1HO,20X,'NO MISSIONS ASSIGNED')                              OUT2       27
  100 RETURN                                                              DEFER     101
      END                                                                 OUT2       30
```

```
F OUT3       76/76   OPT=1 ROUND=+-*/              FTN 4.8+508        09/18/80  09.54.

C*********************************************************************** OUT3        2
C                                                                        OUT3        3
C**** SUBROUTINE OUT3                                                    OUT3        4
C        PRINT MISSION STATUS REPORT.                                    OUT3        5
C                                                                        OUT3        6
C*********************************************************************** OUT3        7
      SUBROUTINE OUT3                                                    OUT3        8
      DIMENSION  G(25,5)                                                 DEFER     102
      COMMON / GGG / G                                                   OUT3       10
      COMMON / MCOL/ MCT,MCA,MCG                                         OUT3       11
   10 FORMAT(1HO)                                                        OUT3       12
 1000 FORMAT(1H+,31X,F4.0,F10.1,1X,F8.1,F9.1,1X,F8.1)                    OUT3       13
C                                                                        OUT3       14
C                                                                        OUT3       15
      WRITE(6,10)                                                        BLANK       5
      WRITE(6,10)                                                        OUT3       17
      WRITE(6,20)                                                        OUT3       18
   20 FORMAT(1H ,'M I S S I O N   S T A T U S   R E P O R T')            OUT3       19
      WRITE(6,30)                                                        OUT3       20
   30 FORMAT(1H ,'-----------------------------------------')            OUT3       21
      WRITE(6,40)                                                        OUT3       22
   40 FORMAT(1HO,31X,' NO.      S.T.    % ST    100 CF    % CF')        OUT3       23
      WRITE(6,50)                                                        OUT3       24
   50 FORMAT(1H ,31X,'-----  --------  ------  --------  ------')        OUT3       25
      WRITE(6,60)                                                        OUT3       26
      WRITE(6,1000) (G(1,J),J=1,MCG)                                     OUT3       27
   60 FORMAT(1H ,'1) ORIGINAL MISSIONS ASSIGNED  ')                      OUT3       28
      WRITE(6,70)                                                        OUT3       29
      WRITE(6,1000) (G(2,J),J=1,MCG)                                     OUT3       30
   70 FORMAT(1H ,9X,'COMPLETED IN FULL      ')                          OUT3       31
      WRITE(6,80)                                                        OUT3       32
      WRITE(6,1000) (G(3,J),J=1,MCG)                                     OUT3       33
   80 FORMAT(1H ,9X,'CONTRACTED IN FULL     ')                          OUT3       34
      WRITE(6,85)                                                        DEFER     103
      WRITE(6,1000) (G(4,J),J=1,MCG)                                     DEFER     104
   85 FORMAT(1H ,9X,'DEFERRED IN FULL       ')                          DEFER     105
      WRITE(6,90)                                                        OUT3       35
      WRITE(6,1000) (G(5,J),J=1,MCG)                                     DEFER     106
   90 FORMAT(1H ,9X,'SKIPPED IN FULL        ')                          OUT3       37
      WRITE(6,100)                                                       OUT3       38
      WRITE(6,1000) (G(6,J),J=1,MCG)                                     DEFER     107
  100 FORMAT(1H ,9X,'   COMPLETED IN PART  ')                           OUT3       40
      WRITE(6,110)                                                       OUT3       41
      WRITE(6,1000) (G(7,J),J=1,MCG)                                     DEFER     108
  110 FORMAT(1H ,9X,'   CONTRACTED IN PART ')                           OUT3       43
      WRITE(6,115)                                                       DEFER     109
      WRITE(6,1000) (G(8,J),J=1,MCG)                                     DEFER     110
  115 FORMAT(1H ,9X,'   DEFERRED IN PART   ')                           DEFER     111
      WRITE(6,120)                                                       OUT3       44
      WRITE(6,1000) (G(9,J),J=1,MCG)                                     DEFER     112
  120 FORMAT(1H ,9X,'   SKIPPED IN PART    ')                          OUT3       46
      WRITE(6,130)                                                       OUT3       47
      WRITE(6,1000)(G(10,J),J=1,MCG)                                     DEFER     113
  130 FORMAT(1HO,'2) ADDITIONAL MISSIONS ASSIGNED')                      OUT3       49
      WRITE(6,140)                                                       OUT3       50
      WRITE(6,1000)(G(11,J),J=1,MCG)                                     DEFER     114
  140 FORMAT(1H ,9X,'FRACTIONAL MISSIONS   ')                            OUT3       52
```

```
E OUT3       76/76  OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

      WRITE(6,150)                                                      OUT3       53
      WRITE(6,1000)(G(12,J),J=1,MCG)                                    DEFER     115
  150 FORMAT(1H ,9X,'  COMPLETED                 ')                   OUT3       55
      WRITE(6,155)                                                      DEFER     116
      WRITE(6,1000)(G(13,J),J=1,MCG)                                    DEFER     117
  155 FORMAT(1H ,9X,'  DEFERRED                  ')                   DEFER     118
      WRITE(6,160)                                                      OUT3       56
      WRITE(6,1000)(G(14,J),J=1,MCG)                                    DEFER     119
  160 FORMAT(1H ,9X,'  SKIPPED                   ')                   OUT3       58
      WRITE(6,170)                                                      OUT3       59
      WRITE(6,1000)(G(15,J),J=1,MCG)                                    DEFER     120
  170 FORMAT(1H ,9X,'WHOLE MISSIONS              ')                   OUT3       61
      WRITE(6,180)                                                      OUT3       62
      WRITE(6,1000)(G(16,J),J=1,MCG)                                    DEFER     121
  180 FORMAT(1H ,9X,'  COMPLETED IN FULL         ')                   OUT3       64
      WRITE(6,185)                                                      OUT3       65
      WRITE(6,1000)(G(17,J),J=1,MCG)                                    DEFER     122
  185 FORMAT(1H ,9X,'  CONTRACTED IN FULL        ')                   OUT3       67
      WRITE(6,187)                                                      DEFER     123
      WRITE(6,1000)(G(18,J),J=1,MCG)                                    DEFER     124
  187 FORMAT(1H ,9X,'  DEFERRED IN FULL          ')                   DEFER     125
      WRITE(6,190)                                                      OUT3       68
      WRITE(6,1000)(G(19,J),J=1,MCG)                                    DEFER     126
  190 FORMAT(1H ,9X,'  SKIPPED IN FULL           ')                   OUT3       70
      WRITE(6,200)                                                      OUT3       71
      WRITE(6,1000)(G(20,J),J=1,MCG)                                    DEFER     127
  200 FORMAT(1H ,9X,'  COMPLETED IN PART         ')                   OUT3       73
      WRITE(6,210)                                                      OUT3       74
      WRITE(6,1000)(G(21,J),J=1,MCG)                                    DEFER     128
  210 FORMAT(1H ,9X,'  CONTRACTED IN PART        ')                   OUT3       76
      WRITE(6,215)                                                      DEFER     129
      WRITE(6,1000)(G(22,J),J=1,MCG)                                    DEFER     130
  215 FORMAT(1H ,9X,'  DEFERRED IN PART          ')                   DEFER     131
      WRITE(6,220)                                                      OUT3       77
      WRITE(6,1000)(G(23,J),J=1,MCG)                                    DEFER     132
  220 FORMAT(1H ,9X,'  SKIPPED IN PART           ')                   OUT3       79
      RETURN                                                            OUT3       80
      END                                                               OUT3       81
```

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: OUT4       76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

C*********************************************************************** OUT4        2
C                                                                         OUT4        3
C**** SUBROUTINE OUT4                                                     OUT4        4
C        PRINT VEHICLE STATUS REPORT.                                     OUT4        5
C                                                                         OUT4        6
C*********************************************************************** OUT4        7
      SUBROUTINE OUT4(K)                                                  OUT4        8
      DIMENSION  T(100,9,25), A(500,9,25), E(1000,2,25), P(15,25)         DEFER4    130
      DIMENSION  D(500,9), F(500,2,25), Q(12,25)                          DEFER4    131
      INTEGER P                                                           OUT4       11
      LEVEL 2, T,A,F,E,D                                                  OUT4       12
      COMMON / AAA / A                                                    DEFER4    132
      COMMON / BBB / D,E,F,T                                              DEFER4    133
      COMMON / PPP / P                                                    OUT4       14
      COMMON / QQQ / Q                                                    OUT4       15
    5 FORMAT(1H )                                                         OUT4       16
   10 FORMAT(1HO)                                                         OUT4       17
 1000 FORMAT(1H+,23X,F10.1,8X,F6.1,7X,F8.2)                               OUT4       18
C                                                                         OUT4       19
C                                                                         OUT4       20
      WRITE(6,10)                                                         BLANK       6
      WRITE(6,10)                                                         BLANK       7
      WRITE(6,10)                                                         OUT4       22
      WRITE(6,20)                                                         OUT4       23
   20 FORMAT(1H ,'V E H I C L E   S T A T U S   R E P O R T')             OUT4       24
      WRITE(6,30)                                                         OUT4       25
   30 FORMAT(1H ,'----------------------------------------')              OUT4       26
      WRITE(6,40) P(8,K)                                                  OUT4       27
   40 FORMAT(1H ,'NO. OF VEHICLES USED          ',I3)                     OUT4       28
      IF(P(8,K).GT.0) GO TO  60                                           OUT4       29
      WRITE(6,5)                                                          OUT4       30
      WRITE(6,50)                                                         OUT4       31
   50 FORMAT(1H ,'NO MISSIONS PERFORMED')                                 OUT4       32
      WRITE(6,5)                                                          OUT4       33
      GO TO 215                                                           OUT4       34
   60 WRITE(6,70) Q(7,K)                                                  OUT4       35
   70 FORMAT(1H ,'UNUSED CAPACITY (%)           ',F4.0)                   OUT4       36
      WRITE(6,80) Q(8,K)                                                  OUT4       37
   80 FORMAT(1H ,'VEHICLE CUBIC EFFICIENCY (%) ',F4.0)                    OUT4       38
      WRITE(6,90) Q(9,K)                                                  OUT4       39
   90 FORMAT(1H ,'VEHICLE PAYLOAD EFF. (%)      ',F4.0)                   OUT4       40
      WRITE(6,5)                                                          OUT4       41
      WRITE(6,10)                                                         BLANK       8
      WRITE(6,100)                                                        OUT4       42
  100 FORMAT(1H ,'CONSIDERING ONLY THE VEHICLES USED AND MISSIONS PERFOR  OUT4       43
     *MED-')                                                              OUT4       44
      WRITE(6,5)                                                          OUT4       45
      WRITE(6,110)                                                        OUT4       46
  110 FORMAT(1H ,25X,'TOT. VEH-HRS     PERCENT     AVER/MISSION')         OUT4       47
      WRITE(6,120)                                                        OUT4       48
  120 FORMAT(1H ,25X,'------------     -------     ------------')         OUT4       49
      S=FLOAT(P(8,K)*(P(10,K)-P(9,K)))                                    OUT4       50
      U=0.                                                                OUT4       51
      N7=P(7,K)                                                           OUT4       52
      DO 130 I=1,N7                                                       OUT4       53
      IF(F(I,2,K).EQ.0.) GO TO 130                                        OUT4       54
      U=U+1.                                                              OUT4       55
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: OUT4       76/76  OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

  130 CONTINUE                                                          OUT4       56
      U=60.*U                                                           OUT4       57
      V=0.                                                              OUT4       58
      DO 140 I=1,6                                                      OUT4       59
      V=V+Q(I,K)                                                        OUT4       60
  140 CONTINUE                                                          OUT4       61
      T1=Q(1,K)/60.                                                     OUT4       62
      T2=100.*Q(1,K)/S                                                  OUT4       63
      T3=Q(1,K)/U                                                       OUT4       64
      WRITE(6,150)                                                      OUT4       65
      WRITE(6,1000) T1,T2,T3                                            OUT4       66
  150 FORMAT(1H ,'TRAVEL                  ')                            OUT4       67
      T1=Q(2,K)/60.                                                     OUT4       68
      T2=100.*Q(2,K)/S                                                  OUT4       69
      T3=Q(2,K)/U                                                       OUT4       70
      WRITE(6,160)                                                      OUT4       71
      WRITE(6,1000) T1,T2,T3                                            OUT4       72
  160 FORMAT(1H ,'DELAY (DEPT. POINT)   ')                              OUT4       73
      T1=Q(3,K)/60.                                                     OUT4       74
      T2=100.*Q(3,K)/S                                                  OUT4       75
      T3=Q(3,K)/U                                                       OUT4       76
      WRITE(6,170)                                                      OUT4       77
      WRITE(6,1000) T1,T2,T3                                            OUT4       78
  170 FORMAT(1H ,'DELAY (INTERM. POINT)')                               OUT4       79
      T1=Q(4,K)/60.                                                     OUT4       80
      T2=100.*Q(4,K)/S                                                  OUT4       81
      T3=Q(4,K)/U                                                       OUT4       82
      WRITE(6,180)                                                      OUT4       83
      WRITE(6,1000) T1,T2,T3                                            OUT4       84
  180 FORMAT(1H ,'DELAY (RTN POINT)     ')                              OUT4       85
      T1=Q(5,K)/60.                                                     OUT4       86
      T2=100.*Q(5,K)/S                                                  OUT4       87
      T3=Q(5,K)/U                                                       OUT4       88
      WRITE(6,190)                                                      OUT4       89
      WRITE(6,1000) T1,T2,T3                                            OUT4       90
  190 FORMAT(1H ,'LOADING               ')                              OUT4       91
      T1=Q(6,K)/60.                                                     OUT4       92
      T2=100.*Q(6,K)/S                                                  OUT4       93
      T3=Q(6,K)/U                                                       OUT4       94
      WRITE(6,200)                                                      OUT4       95
      WRITE(6,1000) T1,T2,T3                                            OUT4       96
  200 FORMAT(1H ,'UNLOADING             ')                              OUT4       97
      T1=(S-V)/60.                                                      OUT4       98
      T2=100.*(S-V)/S                                                   OUT4       99
      T3=(S-V)/U                                                        OUT4      100
      WRITE(6,210)                                                      OUT4      101
      WRITE(6,1000) T1,T2,T3                                            OUT4      102
  210 FORMAT(1H ,'IDLE                  ')                              OUT4      103
  215 WRITE(6,5)                                                        OUT4      104
      T1=FLOAT(P(10,K)-P(9,K))/60.                                      OUT4      105
      WRITE(6,220) T1                                                   OUT4      106
  220 FORMAT(1HO,'HOURS FROM FIRST DEPARTURE TO LAST DESIRED ARRIVAL= ', BLANK       9
     * F8.2)                                                           BLANK      10
      RETURN                                                            OUT4      109
      END                                                               OUT4      110
```

```
E OUT5       76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

C*********************************************************************** OUT5        1
C                                                                        OUT5        2
C**** SUBROUTINE OUT5                                                    OUT5        3
C         PRINT STATISTICS ON DEFERRED MISSIONS.                         OUT5        4
C                                                                        OUT5        5
C*********************************************************************** OUT5        6
      SUBROUTINE OUT5(K)                                                 OUT5        7
      DIMENSION  DT(6,25)                                                OUT5        8
      COMMON / DDD / ITRNS,TRTM,DFTM,NCE,IB,NZE,DT                       OUT5        9
    5 FORMAT(1H0)                                                        BLANK       1
   10 FORMAT(1H1)                                                        OUT5       10
 1000 FORMAT(1H+,25X,F8.1,8X,F8.2)                                       OUT5       11
C                                                                        OUT5       12
C                                                                        OUT5       13
      WRITE(6,10)                                                        OUT5       14
      WRITE(6,5)                                                         BLANK       2
      WRITE(6,5)                                                         BLANK       3
      WRITE(6,20)                                                        OUT5       15
   20 FORMAT(1H ,'D E F E R R E D   M I S S I O N S   R E P O R T')       OUT5       16
      WRITE(6,25)                                                        OUT5       17
   25 FORMAT(1H ,'-----------------------------------------')            OUT5       18
      WRITE(6,30)                                                        OUT5       19
   30 FORMAT(1H0,26X,'  TOTAL         AVG/MISSION')                     OUT5       20
      WRITE(6,35)                                                        OUT5       21
   35 FORMAT(1H ,26X,'  -----         -----------')                     OUT5       22
      T1=DT(1,K)                                                         OUT5       23
      IF(T1.LE.0.) GO TO 900                                             OUT5       24
      WRITE(6,100)                                                       OUT5       25
      WRITE(6,1000) T1                                                   OUT5       26
  100 FORMAT(1H ,'NO. OF MISSIONS       ')                               OUT5       27
      T1=DT(2,K)/60.                                                     OUT5       28
      T2=T1/DT(1,K)                                                      OUT5       29
      WRITE(6,200)                                                       OUT5       30
      WRITE(6,1000) T1,T2                                                OUT5       31
  200 FORMAT(1H ,'NO. OF HOURS DELAYED ')                                OUT5       32
      T1=DT(3,K)                                                         OUT5       33
      T2=T1/DT(1,K)                                                      OUT5       34
      WRITE(6,300)                                                       OUT5       35
      WRITE(6,1000) T1,T2                                                OUT5       36
  300 FORMAT(1H ,'NO. OF TRUCKS         ')                               OUT5       37
      T1=DT(4,K)/10.                                                     BLANK       4
      T2=T1/DT(1,K)                                                      OUT5       39
      WRITE(6,400)                                                       OUT5       40
      WRITE(6,1000) T1,T2                                                OUT5       41
  400 FORMAT(1H ,'NO. OF SHORT TONS     ')                               OUT5       42
      T1=DT(5,K)/100.                                                    OUT5       43
      T2=T1/DT(1,K)                                                      OUT5       44
      WRITE(6,500)                                                       OUT5       45
      WRITE(6,1000) T1,T2                                                OUT5       46
  500 FORMAT(1H ,'NO. OF HUNDREDS OF CF')                                OUT5       47
      RETURN                                                             OUT5       48
  900 WRITE(6,950)                                                       OUT5       49
  950 FORMAT(1H0,10X,'NO DEFERRED MISSIONS')                             OUT5       50
      RETURN                                                             OUT5       51
      END                                                                OUT5       52
```

```
C*********************************************************************** PLOT        2
C                                                                       PLOT        3
C**** SUBROUTINE PLOT                                                   PLOT        4
C       PLOT OUTPUT FOR THE POOL.                                       PLOT        5
C                                                                       PLOT        6
C*********************************************************************** PLOT        7
      SUBROUTINE PLOT(K)                                                PLOT        8
      DIMENSION  T(100,9,25), A(500,9,25), E(1000,2,25), P(15,25)       PLOT1       1
      DIMENSION  D(500,9), F(500,2,25), G(25,5)                         PLOT1       2
      DIMENSION  HR(2000), VEH(2000), TON(2000), CUBE(2000), TM(2000)   PLOT       13
      DIMENSION  LABEL(4), SS(10), SR(10), RS(10), PP(10)               PLOT       14
      DIMENSION  RRR(10), RSS(10), RSR(10), SRS(10)                     PLOT       15
      INTEGER P                                                         PLOT       16
      LEVEL 2, T,A,F,E,D                                                PLOT       17
      COMMON / AAA / A                                                  PLOT1       3
      COMMON / BBB / D,E,F,T                                            PLOT1       4
      COMMON / GGG / G                                                  PLOT       19
      COMMON / PPP / P                                                  PLOT       20
      DATA LABEL/'S BUTLER','BLDG.367','X-2173','CSD-SMB'/              PLOT3       1
C                                                                       PLOT3       2
C                                                                       PLOT3       3
      NM=P(7,K)                                                         PLOT       22
      IF(NM.EQ.0) RETURN                                                PLOT       23
      N2=2*NM                                                           PLOT       24
      START=FLOAT(P(9,K))                                               PLOT       25
      NL=P(6,K)                                                         PLOT       27
      T1=0.                                                             PLOT       28
      T2=0.                                                             PLOT       29
      TV=0.                                                             PLOT       30
      TT=0.                                                             PLOT       31
      TC=0.                                                             PLOT       32
      DO 1100 I=1,N2                                                    PLOT       33
      J1=2*I-1                                                          PLOT       34
      VEH(J1)=TV                                                        PLOT       35
      TON(J1)=TT                                                        PLOT       36
      CUBE(J1)=TC                                                       PLOT       37
      J2=2*I                                                            PLOT       38
      NY=INT(ABS(E(I,2,K)))                                             PLOT       39
      HR(J2)=(E(I,1,K)-START)/60.                                       PLOT       40
      VEH(J2)=TV+SIGN(F(NY,2,K),E(I,2,K))/100.                          PLOT       41
      TM(J2)=HR(J2)                                                     PLOT       42
      IF(E(I,2,K).GT.0.) GO TO 1050                                     PLOT       43
      DO 1025 L=1,NL                                                    PLOT       44
      I3=L                                                              PLOT       45
      IF(T(L,1,K).EQ.A(NY,1,K)) GO TO 1035                              PLOT       46
 1025 CONTINUE                                                          PLOT       47
 1035 IF(T(I3,9,K).GT.0.) GO TO 1045                                    PLOT       48
      TM(J2)=(E(I,1,K)-(T(I3,7,K)+T(I3,8,K))-START)/60.                 PLOT       49
 1045 IF(F(NY,2,K).EQ.0.) GO TO 1050                                    PLOT       50
      T1=T1+A(NY,5,K)                                                   PLOT       51
      T2=T2+A(NY,6,K)                                                   PLOT       52
 1050 TON(J2)=10.*T1/(G(1,2)+G(10,2))                                   PLOT1       5
      CUBE(J2)=T2/(G(1,4)+G(10,4))                                      PLOT1       6
      HR(J1)=HR(J2)                                                     PLOT       55
      TM(J1)=TM(J2)                                                     PLOT       56
      TV=VEH(J2)                                                        PLOT       57
      TT=TON(J2)                                                        PLOT       58
```

```
E PLOT       76/76   OPT=1 ROUND=+-*/                FTN 4.8+508        09/18/80  09.54.

      TC=CUBE(J2)                                                                PLOT       59
 1100 CONTINUE                                                                   PLOT       60
      N3=2*N2-1                                                                  PLOT       61
      ENCODE( 50, 1200, SS )                                                     PLOT       62
 1200 FORMAT( ' NUMBER OF VEHICLES IN USE VS. TIME>' )                           PLOT       63
      ENCODE( 30, 1300, SR )                                                     PLOT       64
 1300 FORMAT( ' NUMBER OF VEHICLES>' )                                           PLOT       65
      ENCODE( 30, 1400, RS )                                                     PLOT       66
 1400 FORMAT( ' TIME, IN HOURS>' )                                               PLOT       67
      ENCODE( 100, 1500, RRR )                                                   PLOT       68
 1500 FORMAT( ' SHORT TONS DELIVERED (% OF TOTAL ASSIGNED) VS. TIME>' )          PLOT       69
      ENCODE( 70, 1600, RSS )                                                    PLOT       70
 1600 FORMAT( ' % OF TOTAL SHORT TONS ASSIGNED>' )                               PLOT       71
      ENCODE( 100, 1700, RSR )                                                   PLOT       72
 1700 FORMAT( ' CUBIC FEET DELIVERED (% OF TOTAL ASSIGNED) VS. TIME>' )          PLOT       73
      ENCODE( 50, 1800, SRS )                                                    PLOT       74
 1800 FORMAT( ' % OF TOTAL CUBIC FEET ASSIGNED >' )                              PLOT       75
      ENCODE( 40, 1900, PP) P(1,K)                                               PLOT2       1
 1900 FORMAT( ' POOL NUMBER',I3,'>' )                                            PLOT       77
      CALL PLTBEG( 13. , 29. , 1.0 , 13 , LABEL )                                PLOT       78
      CALL FIXSCA( HR , N3+1 , 8. , XS , XMIN , XMAX , DX )                      PLOT       79
      CALL FIXSCA( VEH , N3+1 , 6. , YS , YMIN , YMAX , DY )                     PLOT       80
      CALL PLTSCA( 2. , 2. , XMIN , YMIN , XS , YS )                             PLOT       81
      CALL PLTDTS( 1 , 0 , HR , VEH , N3+1 , 0 )                                 PLOT       82
      CALL PLTAXS( DX , DY , XMIN , XMAX , YMIN , YMAX , 4 )                     PLOT       83
      CALL LABELA( DX , DY , XMIN , XMAX , YMIN , YMAX , 1.0 , 1.0 )             PLOT       84
      CALL PLTSYM( 0.10 , SS , 0. , XMIN+(XS*2) , YMAX+(YS*0.25) )               PLOT       85
      CALL PLTSYM( 0.08 , SR , 90., XMIN-(XS*0.75) , YMIN+(YS*2) )               PLOT       86
      CALL PLTSYM( 0.08 , RS , 0. , XMIN+(XS*3) , YMIN-(YS*0.5) )                PLOT       87
      CALL PLTSYM( 0.15 , PP , 0. , XMIN+(XS*3.25), YMAX+(YS*0.75) )             PLOT       88
C BEGIN PLOT OF SHORT TONS DELIVERED                                             PLOT       89
      CALL FIXSCA( TM , N3+1 , 8. , XS , XMIN , XMAX , DX )                      PLOT       90
      CALL PLTSCA( 2. , 11. , TM , 0 , XS , 16.66 )                              PLOT       91
      CALL PLTDTS( 1 , 0 , TM , TON , N3+1 , 0 )                                 PLOT       92
      CALL PLTAXS( DX , 10. , XMIN , XMAX , 0. , 100. , 4 )                      PLOT       93
      CALL LABELA( DX , 10. , XMIN , XMAX , 0. , 100. , 1.0 , 1.0 )              PLOT       94
      CALL PLTSYM( 0.10 , RRR , 0 , XMIN+(XS*1) , 102. )                         PLOT       95
      CALL PLTSYM( 0.08 , RSS , 90. , XMIN-(XS*0.5) , 20. )                      PLOT       96
      CALL PLTSYM( 0.08 , RS , 0. , XMIN+(XS*3) , -9. )                          PLOT       97
      CALL PLTSYM( 0.15 , PP , 0. , XMIN+(XS*3.25) , 108. )                      PLOT       98
C BEGIN PLOT OF CUBIC FEET DELIV.                                                PLOT       99
      CALL FIXSCA( TM , N3+1 , 8. , XS , XMIN , XMAX , DX )                      PLOT      100
      CALL PLTSCA( 2. , 20. , TM , 0 , XS , 16.66 )                              PLOT      101
      CALL PLTDTS( 1 , 0 , TM , CUBE , N3+1 , 0 )                                PLOT      102
      CALL PLTAXS( DX , 10. , XMIN , XMAX , 0. , 100. , 4)                       PLOT      103
      CALL LABELA( DX , 10. , XMIN , XMAX , 0. , 100. , 1.0 , 1.0 )              PLOT      104
      CALL PLTSYM( 0.10 , RSR , 0. , XMIN+(XS*1) , 102. )                        PLOT      105
      CALL PLTSYM( 0.08 , SRS , 90. , XMIN-(XS*0.5) , 20. )                      PLOT      106
      CALL PLTSYM( 0.08 , RS , 0. , XMIN+(XS*3) , -9. )                          PLOT      107
      CALL PLTSYM( 0.15 , PP , 0. , XMIN+(XS*3.25) , 108. )                      PLOT      108
      CALL PLTPGE                                                                PLOT      109
      RETURN                                                                     PLOT      110
      END                                                                        PLOT      111
```

APPENDIX B

TVEM CONTROL PARAMETERS

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APPENDIX B

TVEM CONTROL PARAMETERS

This appendix gives a listing of all control parameters contained in the TVEM. The values that can be assigned to each parameter and the effect of each is also given.

TVEM CONTROL PARAMETERS

Parameters Contained in DATA Statements -

LIST =
- 0 — Input data are not printed.
- 1 — Input data for each pool are printed.

IPLOT =
- 0 — No plots.
- 1 — Results for each pool are plotted.

ISP =
- -1 — All missions will be split if necessary.
- 0 — Each mission will be split or not according to mission parameter as input (A(I,8,K)).
- +1 — All missions will not be permitted to be split.

IDF =
- -1 — All missions will be prevented from being postponed.
- 0 — Missions will be postponed or not according to mission parameter as input (A(I,9,K)).
- +1 — All missions will be postponed if necessary.

ITRNS =
- -1 — If a mission can be transferred, it will be transferred with no postponement.
- 0 — If a mission can be transferred, it will be postponed for only TRTM minutes.
- +1 — All missions will be postponed for at most DFTM minutes whenever necessary.

TRTM - If ITRNS = 0, missions that can be transferred will be postponed for only TRTM minutes.

DFTM - If a mission cannot be transferred or if ITRNS = +1, the mission will be postponed for at most DFTM minutes.

Note: If DFTM exceeds TRTM, a check in the TVEM will reverse the values assigned to ensure that TRTM $\leq$ DFTM.

Parameters Introduced by Input -

$$A(I,7,K) = \begin{cases} 0 & \text{The I-th mission assigned to the K-th pool cannot be transferred.} \\ N & \text{The mission can be transferred to the pool whose ID No. is N, whenever necessary.} \end{cases}$$

$$A(I,8,K) = \begin{cases} 1 & \text{The I-th mission assigned to the K-th pool can be split whenever necessary.} \\ 2 & \text{The mission cannot be split.} \end{cases}$$

$$A(I,9,K) = \begin{cases} 0 & \text{The I-th mission assigned to the K-th pool will not be postponed} \\ 1 & \text{The mission will be postponed, in full or in part, whenever necessary.} \end{cases}$$

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APPENDIX C

MISSION DEFERMENT NARRATIVE

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APPENDIX C

MISSION DEFERMENT NARRATIVE

This appendix consists of a detailed documentation of those TVEM routines concerned with the deferment of missions. The documentation is in the form of a nearly line-by-line explanation of the FORTRAN coding. Included at various points in the narrative are line numbers which refer to the program lines of coding as shown at the right hand side of each page of the program listing in Appendix A.

MISSION DEFERMENT NARRATIVE

If a mission cannot be completed because of a shortage of available vehicles, the mission can be postponed for a specified amount of time in the hope of finding a slack period in the schedule of remaining missions.

Subroutine REMAIN.

If the mission is the remainder of a split mission, the amount of remaining cargo is calculated along with the required truck capacity and the number of trucks needed. The amount of required capacity is stored for later use.

Subroutine PSTPN.

For entire missions as well as the remainders of split missions, the index of the current event is obtained and the index to access the mission information is also obtained. Next, a control parameter, IRT, is set to zero. If the mission can be completed later, IRT will be reset to one. If the mission of interest is an entire mission, the amount of truck capacity that was earlier determined to be required for the mission is set to zero. If the number of trucks required for the mission exceeds that assigned to the pool, the attempt to defer the mission is aborted. Otherwise, if permission to defer the mission has been denied by input, the attempt is aborted. Alternatively, if the parameter, ITRNS, is negative and the mission can be transferred, the transfer will not be delayed. However, if ITRNS is equal to zero and the mission can be transferred, it will be delayed for only TRTM minutes. Otherwise, the mission can be delayed for DFTM minutes in attempting completion.

If other missions for this pool that were deferred are scheduled for completion, the departure times are put into chronological order (PSTPN 48). The scheduled departure time for the mission of interest is obtained along with the number of trucks that are occupied. Next, the number of scheduled events is calculated and the index of the next event is obtained. If the mission of interest is the last one scheduled, the attempt to defer it is aborted. Otherwise, the remaining events are inspected to find a

slack period (loop PSTPN 66 - PSTPN 142). For a remaining event, the number of trucks involved is calculated and the number of trucks that are occupied is increased or decreased according to whether the trucks are departing or returning. If the event is a departure, the routine continues checking the remaining events. If the event is a return, the routine checks to see if enough trucks are back from the mission that a sufficient number of vehicles would be available for the pool to accomplish the delayed mission. If not, the routine continues checking the remaining events. On the other hand, if enough trucks would be available, the routine checks to see if it would be too late anyway. That is, whether the time associated with the vehicle return from mission is later than the critical delay time as determined by adding the permissible delay to the time that the trucks were originally scheduled to depart on the mission. If it is too late, the attempt to defer the mission is aborted at this point (PSTPN 82).

If it is not too late, the model must check that enough vehicles will be available for a sufficient length of time to complete the mission. First, the time that the mission could be tentatively scheduled for vehicle departure is stored and the index of the next event is obtained. The model then cycles through each of the remaining scheduled event times. The object of this loop (PSTPN 90 - PSTPN 143) is to find the first scheduled mission departure that would require the use of one or all of the trucks that are needed for the deferred mission. The time gap, defined by the time that enough vehicles would first be available for the deferred mission until the earliest time that a scheduled mission would require at least one of those vehicles, will then be checked to see if there would be enough time to complete the deferred mission.

In checking each of the remaining events the model first determines the number of trucks associated with the event. If it is a return from a mission, the number of vehicles that are occupied is decreased by the number of returning trucks and the routine continues checking the remaining events. On the other hand, if it is a mission departure, the number of trucks occupied is increased by the number of trucks required for the scheduled mission and a check is made to see if there will still be enough trucks available for the deferred mission. If so, the model considers the next event. However, if the scheduled mission would require at least one of the trucks needed for the deferred mission, the time gap thus defined is checked to see if it is sufficient for the deferred mission (PSTPN 107). If not, the model continues the search for another time gap. On the other hand, if the time gap is sufficient for the deferred mission, the model must then check to ensure that the time gap has not been usurped by other deferred missions.

If no other missions have yet been deferred, all is well. Otherwise, the times of the deferred missions, having been ordered chronologically by the mission departure times, are checked in turn (PSTPN 109 - PSTPN 120). If the mission departure and return times completely span the time

gap, it is abandoned and the model continues the search for another suitable time gap. But, if the departure time for the deferred mission is later than the end of the contemplated time gap, all is well because any remaining deferred missions will have their departure times even later. If the return time for the deferred mission is earlier than the beginning of the time gap, the model considers the remaining deferred missions, if any. On the other hand, if the deferred mission ends within the time gap of interest, the time span defined by the beginning of the gap and the departure of the deferred mission is checked to see if it is long enough to accommodate the mission that we wish to defer. If so, all is well. Otherwise, the starting time of the time gap is set equal to the return time of the previously deferred mission. If the resulting time gap is too short for the mission to be deferred, the gap is abandoned and the model searches for another suitable slack period. If the time gap is sufficiently long, but the starting time would be beyond the permissible delay period, the time gap is abandoned and the attempt to defer the mission is aborted (PSTPN 2.1). Otherwise, the model has determined that there exists enough time and enough trucks to successfully reschedule the mission. Accordingly, the mission start and return times are reset. The index for the number of successfully deferred missions is incremented by one and the start and return times are stored in a separate array so that they are available for checking in the course of attempting to defer any subsequent regularly scheduled missions. The parameter to record the maximum number of vehicles occupied is checked and the control parameter, IRT, is set equal to one. Finally, if the mission that has been rescheduled is the remainder of a split mission, the variable that stores the number of the pool to which the mission could have been transferred is set to minus one before program control returns to the main program.

The dispatch and return times for any transferable mission that has been deferred unsuccessfully must be increased by the amount of time the mission was delayed before program control returns to the main program.

A few more details in the main program remain concerning the deferment methodology. Upon returning from Subroutine PSTPN, the model checks to see if the mission has been successfully deferred and is an entire mission. If so, the model resets the mission disposition code to one of five values indicating that it is an entire mission deferred in full. The model then considers the next scheduled event. If it is an entire mission that was not successfully deferred, the amount of truck capacity required for the mission is set to zero.

Subroutine STRMSS.

But, if the mission is the remainder of a split mission, Subroutine STRMSS is called for storage of the mission tonnage and cube. This information is printed out in the Mission Status Report. Subroutine STRMSS is also used to store information on the remainders of split missions that are to be transferred or skipped. The proper storage of the mission

information is controlled by the value stored in the variable A(N,7,K) which contains the number of the pool to which the mission can be transferred. At this point in the mission processing, the value in A(N,7,K) could be positive, indicating that the mission is to be transferred. The variable A(N,7,K) could be negative, indicating that the mission has been successfully deferred or it could be zero, indicating that the mission will be skipped. After the mission information has been properly stored for later reporting, program control returns to the main TVEM program.

If the mission has not been successfully deferred and it is permissible to transfer the mission to another pool, the program calls Subroutine TRNSFR which stores the mission information temporarily pending later execution of the mission transfer.

Finally, the model checks the variable which stores the maximum vehicle usage and proceeds to check the next scheduled event.

After all of the mission events for a pool have been processed, the model inspects each of the missions (the coding lines between MAIN 493 and MAIN 496). If the mission is the remainder of a split mission, the value of the truck capacity required for the mission is first set to zero. If the mission was successfully deferred, the capacity is reset to a value that was determined in Subroutine REMAIN.

APPENDIX D

TEST CASE INPUT AND OUTPUT

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APPENDIX D

TEST CASE INPUT AND OUTPUT

Test Case Input

For an explanation of the TVEM input structure and formats the user is advised to refer to TR-311[1], Section 2.3 and Appendix C.

According to the first input card, the data for the test case consist of information on two vehicle pools. The important points regarding the input data are given in the following paragraphs.

The first pool, identified as Pool Number 1, consists of two trucks, each of which can haul 1/2 ton or 100 cubic feet of cargo. The next six cards give the information for the routes on which the missions assigned to the pool are to occur. The data for the routes are terminated by a negative value on the ninth card.

The next five cards comprise the schedule of missions assigned to the pool. Each of the missions can be transferred to Pool Number 4, if necessary. Notice, however, that according to the entry in the ninth field of each card, each mission may be deferred if it cannot be dispatched at the scheduled time. Each of the missions can be split, if necessary, with the exception of the fourth mission. Notice also, that this mission requires that 1.5 tons of cargo be hauled. Because there are not enough trucks assigned to the pool to haul this much cargo, any attempt to defer the mission will be aborted and the mission will be transferred.

For this test case, the values of TRTM and DFTM have been established as 90 minutes and 120 minutes, respectively (see Appendix A). Moreover, the control parameter, ITRNS, has been set to zero. Therefore, any mission that cannot be undertaken by the pool at the scheduled time will not be transferred immediately, but will be delayed for 90 minutes at most.

The data for the second pool, identified as Pool Number 4, are identical to those of the first pool except that the missions can neither be transferred nor deferred.

[1] Loc.Cit.

********** TEST CASE INPUT **********

```
    2
    1     7     5   100     2
 1.        1.        1.        1.        6.        6.        1.        6.        0.
 2.        2.        2.        2.        5.        5.        2.        5.        0.
 3.        3.        3.        3.        4.        4.        3.        4.        0.
 4.        4.        0.        4.        3.        3.        4.        3.        3.
 5.        5.        0.        5.        2.        2.        5.        2.        2.
 6.        6.        0.        6.        1.        1.        6.        1.        1.
-100001.
 5.        1.        0.        115.      15.       75.       4.        1.        1.
 1.        1.        0.        127.      5.        50.       4.        1.        1.
 6.        1.        115.      0.        10.       110.      4.        1.        1.
 4.        1.        0.        200.      15.       90.       4.        2.        1.
 2.        1.        830.      0.        10.       70.       4.        1.        1.
-100002.
    4     7     5   100     2
 1.        1.        1.        1.        6.        6.        1.        6.        0.
 2.        2.        2.        2.        5.        5.        2.        5.        0.
 3.        3.        3.        3.        4.        4.        3.        4.        0.
 4.        4.        0.        4.        3.        3.        4.        3.        3.
 5.        5.        0.        5.        2.        2.        5.        2.        2.
 6.        6.        0.        6.        1.        1.        6.        1.        1.
-200001.
 5.        1.        0.        115.      15.       75.       0.        1.        0.
 1.        1.        0.        127.      5.        50.       0.        1.        0.
 6.        1.        115.      0.        10.       110.      0.        1.        0.
 4.        1.        0.        200.      15.       90.       0.        2.        0.
 2.        1.        830.      0.        10.       70.       0.        1.        0.
-200002.
-9999
```

Test Case Output

The first two pages of output from the simulation are the listings of the input data for each of the two pools, to include the pool characteristics and the links and missions arrays for each.

The next four pages of output give the simulation results by pool. Two pages are devoted to the results of each. For Pool Number 1, we see that five missions were assigned. Of these five missions, two were completed in full, one was transferred, and one was deferred in full. The remaining mission was split, with one part completed and the remainder deferred. Thus, two missions were deferred; one entire mission and the remainder of a split mission. The mission that was transferred required more vehicles than were assigned to the pool, so the TVEM made no attempt to defer it.

The second page of output for the pool gives some information about the five deferred missions in the Deferred Missions Report. In addition to giving the amount of cargo and the number of trucks required, the number of hours that the missions were delayed is also reported. The table also gives the per-mission average values for these items.

Recalling that the missions assigned to Pool Number 4 were very similar to those assigned to Pool Number 1, it is no surprise to find that the output for Pool 4 is identical to that of Pool 1, except for the following differences. Whereas, in the first pool, one mission was transferred in full and one was deferred in full, the corresponding missions assigned to Pool 4 were skipped in full. Also, the remainder of the split mission was skipped, unlike that in Pool 1 where the remainder of the corresponding mission was deferred. Finally, because Pool Number 4 was not permitted to defer any of the missions, the Deferred Missions Report contains no information.

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

POOL NUMBER	1
VEHICLE NUMBER	7
VEH. PAY.(STX10)	5
VEH. CUBIC CAP.	100
NO. OF VEHICLES	2
NUMBER OF LINKS	6
NO. OF MISSIONS	5

LINKS

T(R,C)	C1	C2	C3	C4	C5	C6	C7	C8	C9
R 1 /	1.0	1.0	1.0	1.0	6.0	6.0	1.0	6.0	0.0
R 2 /	2.0	2.0	2.0	2.0	5.0	5.0	2.0	5.0	0.0
R 3 /	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	0.0
R 4 /	4.0	4.0	0.0	4.0	3.0	3.0	4.0	3.0	3.0
R 5 /	5.0	5.0	0.0	5.0	2.0	2.0	5.0	2.0	2.0
R 6 /	6.0	6.0	0.0	6.0	1.0	1.0	6.0	1.0	1.0

MISSIONS

A(R,C)	C1	C2	C3	C4	C5	C6	C7	C8	C9
R 1 /	5.0	1.0	0.0	115.0	15.0	75.0	4.0	1.0	1.0
R 2 /	1.0	1.0	0.0	127.0	5.0	50.0	4.0	1.0	1.0
R 3 /	6.0	1.0	115.0	0.0	10.0	110.0	4.0	1.0	1.0
R 4 /	4.0	1.0	0.0	200.0	15.0	90.0	4.0	2.0	1.0
R 5 /	2.0	1.0	830.0	0.0	10.0	70.0	4.0	1.0	1.0

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POOL NUMBER	4
VEHICLE NUMBER	7
VEH. PAY.(STX10)	5
VEH. CUBIC CAP.	100
NO. OF VEHICLES	2
NUMBER OF LINKS	6
NO. OF MISSIONS	5

LINKS

T(R,C)	C1	C2	C3	C4	C5	C6	C7	C8	C9
R 1 /	1.0	1.0	1.0	1.0	6.0	6.0	1.0	6.0	0.0
R 2 /	2.0	2.0	2.0	2.0	5.0	5.0	2.0	5.0	0.0
R 3 /	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	0.0
R 4 /	4.0	4.0	0.0	4.0	3.0	3.0	4.0	3.0	3.0
R 5 /	5.0	5.0	0.0	5.0	2.0	2.0	5.0	2.0	2.0
R 6 /	6.0	6.0	0.0	6.0	1.0	1.0	6.0	1.0	1.0

MISSIONS

A(R,C)	C1	C2	C3	C4	C5	C6	C7	C8	C9
R 1 /	5.0	1.0	0.0	115.0	15.0	75.0	0.0	1.0	0.0
R 2 /	1.0	1.0	0.0	127.0	5.0	50.0	0.0	1.0	0.0
R 3 /	6.0	1.0	115.0	0.0	10.0	110.0	0.0	1.0	0.0
R 4 /	4.0	1.0	0.0	200.0	15.0	90.0	0.0	2.0	0.0
R 5 /	2.0	1.0	830.0	0.0	10.0	70.0	0.0	1.0	0.0

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SIMULATING POOL NO. 1

SIMULATING POOL NO. 4

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

OUTPUT FOR POOL NO.	1
VEHICLE NUMBER	7
VEHICLE PAYLOAD (STX10)	5
VEHICLE CUBIC CAPACITY	100
NO. OF VEHICLES IN POOL	2

M I S S I O N   S T A T U S   R E P O R T

	NO.	S.T.	% ST	100 CF	% CF
1) ORIGINAL MISSIONS ASSIGNED	5.	5.5	100.0	4.0	100.0
COMPLETED IN FULL	2.	2.0	36.4	1.8	45.6
CONTRACTED IN FULL	1.	1.5	27.3	.9	22.8
DEFERRED IN FULL	1.	.5	9.1	.5	12.7
SKIPPED IN FULL	0.	0.0	0.0	0.0	0.0
COMPLETED IN PART	1.	1.0	18.2	.5	12.7
CONTRACTED IN PART	0.	0.0	0.0	0.0	0.0
DEFERRED IN PART	1.	.5	9.1	.3	6.3
SKIPPED IN PART	0.	0.0	0.0	0.0	0.0
2) ADDITIONAL MISSIONS ASSIGNED	0.	0.0	0.0	0.0	0.0
FRACTIONAL MISSIONS	0.	0.0	0.0	0.0	0.0
COMPLETED	0.	0.0	0.0	0.0	0.0
DEFERRED	0.	0.0	0.0	0.0	0.0
SKIPPED	0.	0.0	0.0	0.0	0.0
WHOLE MISSIONS	0.	0.0	0.0	0.0	0.0
COMPLETED IN FULL	0.	0.0	0.0	0.0	0.0
CONTRACTED IN FULL	0.	0.0	0.0	0.0	0.0
DEFERRED IN FULL	0.	0.0	0.0	0.0	0.0
SKIPPED IN FULL	0.	0.0	0.0	0.0	0.0
COMPLETED IN PART	0.	0.0	0.0	0.0	0.0
CONTRACTED IN PART	0.	0.0	0.0	0.0	0.0
DEFERRED IN PART	0.	0.0	0.0	0.0	0.0
SKIPPED IN PART	0.	0.0	0.0	0.0	0.0

D E F E R R E D   M I S S I O N S   R E P O R T

	TOTAL	AVG/MISSION
NO. OF MISSIONS	2.0	
NO. OF HOURS DELAYED	2.3	1.16
NO. OF TRUCKS	2.0	1.00
NO. OF SHORT TONS	1.0	.50
NO. OF HUNDREDS OF CF	.5	.25

V E H I C L E   S T A T U S   R E P O R T

NO. OF VEHICLES USED	2
UNUSED CAPACITY (%)	0.
VEHICLE CUBIC EFFICIENCY (%)	44.
VEHICLE PAYLOAD EFF. (%)	125.

CONSIDERING ONLY THE VEHICLES USED AND MISSIONS PERFORMED-

	TOT. VEH-HRS	PERCENT	AVER/MISSION
TRAVEL	1.1	6.7	.21
DELAY (DEPT. POINT)	.5	3.3	.11
DELAY (INTERM. POINT)	.4	2.5	.08
DELAY (RTN POINT)	.4	2.5	.08
LOADING	.2	1.4	.04
UNLOADING	.4	2.5	.08
IDLE	13.0	81.2	2.60

HOURS FROM FIRST DEPARTURE TO LAST DESIRED ARRIVAL=   8.02
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

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OUTPUT FOR POOL NO.	4
VEHICLE NUMBER	7
VEHICLE PAYLOAD (STX10)	5
VEHICLE CUBIC CAPACITY	100
NO. OF VEHICLES IN POOL	2

M I S S I O N   S T A T U S   R E P O R T

	NO.	S.T.	% ST	100 CF	% CF
1) ORIGINAL MISSIONS ASSIGNED	5.	5.5	78.6	4.0	81.4
COMPLETED IN FULL	2.	2.0	28.6	1.8	37.1
CONTRACTED IN FULL	0.	0.0	0.0	0.0	0.0
DEFERRED IN FULL	0.	0.0	0.0	0.0	0.0
SKIPPED IN FULL	2.	2.0	28.6	1.4	28.9
COMPLETED IN PART	1.	1.0	14.3	.5	10.3
CONTRACTED IN PART	0.	0.0	0.0	0.0	0.0
DEFERRED IN PART	0.	0.0	0.0	0.0	0.0
SKIPPED IN PART	1.	.5	7.1	.3	5.2
2) ADDITIONAL MISSIONS ASSIGNED	1.	1.5	21.4	.9	18.6
FRACTIONAL MISSIONS	0.	0.0	0.0	0.0	0.0
COMPLETED	0.	0.0	0.0	0.0	0.0
DEFERRED	0.	0.0	0.0	0.0	0.0
SKIPPED	0.	0.0	0.0	0.0	0.0
WHOLE MISSIONS	1.	1.5	21.4	.9	18.6
COMPLETED IN FULL	0.	0.0	0.0	0.0	0.0
CONTRACTED IN FULL	0.	0.0	0.0	0.0	0.0
DEFERRED IN FULL	0.	0.0	0.0	0.0	0.0
SKIPPED IN FULL	1.	1.5	21.4	.9	18.6
COMPLETED IN PART	0.	0.0	0.0	0.0	0.0
CONTRACTED IN PART	0.	0.0	0.0	0.0	0.0
DEFERRED IN PART	0.	0.0	0.0	0.0	0.0
SKIPPED IN PART	0.	0.0	0.0	0.0	0.0

D E F E R R E D   M I S S I O N S   R E P O R T

	TOTAL	AVG/MISSION
NO DEFERRED MISSIONS		

V E H I C L E   S T A T U S   R E P O R T

NO. OF VEHICLES USED	2
UNUSED CAPACITY (%)	0.
VEHICLE CUBIC EFFICIENCY (%)	38.
VEHICLE PAYLOAD EFF. (%)	100.

CONSIDERING ONLY THE VEHICLES USED AND MISSIONS PERFORMED-

	TOT. VEH-HRS	PERCENT	AVER/MISSION
TRAVEL	.9	5.4	.29
DELAY (DEPT. POINT)	.4	2.7	.14
DELAY (INTERM. POINT)	.3	1.7	.09
DELAY (RTN POINT)	.3	1.7	.09
LOADING	.2	1.0	.06
UNLOADING	.3	1.7	.09
IDLE	13.8	85.9	4.59

HOURS FROM FIRST DEPARTURE TO LAST DESIRED ARRIVAL= 8.02
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX)

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